HITACHI

No. 0533

CML190SXW
CML190SXWB

SERVICE MANUAL
MANUEL D'ENTRETIEN
WARTUNGSHANDBUCH

CAUTION:
Before servicing this chassis, it is important that the service technician read the "Safety Precautions" and "Product Safety Notices" in this service manual.

ATTENTION:
Avant d'effectuer l'entretien du châassis, le technicien doit lire les «Précautions de sécurité» et les «Notices de sécurité du produit» présentés dans le présent manuel.

VORSICHT:
Vor Öffnen des Gehäuses hat der Service-Ingenieur die „Sicherheitshinweise" und „Hinweise zur Produktsicherheit" in diesem Wartungshandbuch zu lesen.

Data contained within this Service manual is subject to alteration for improvement.

Les données fournies dans le présent manuel d'entretien peuvent faire l'objet de modifications en vue de perfectionner le produit.

Die in diesem Wartungshandbuch enthaltenen Spezifikationen können sich zwecks Verbesserungen ändern.

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SPECIFICATIONS AND PARTS ARE SUBJECT TO CHANGE FOR IMPROVEMENT

TFT LCD MONITOR

July 2002

1. INTRODUCTION

1.1 Scope

This specification defines the requirements for the 19” MICRO-PROCESSOR based Multi-mode supported high resolution color LCD monitor, This monitor can be directly connected to general 15 pin D-sub VGA connector and DVI-D digital connector, eliminates the requirement of optional special display card. It also supports VESA DPMS power management and plug & play function. There is a build-in stereo audio amplifier with volume control to drive a pair of speakers.

1.2 Description

The LCD monitor is designed with the latest LCD technology to provide a performance oriented product with no radiation. This will alleviate the growing health concerns. It is also a space saving design, allowing more desktop space, and comparing to the traditional CRT monitor, it consumes less power and gets less weight in addition MTBF target is 20k hours or more.

2. ELECTRICAL REQUIREMENTS

2.1 *Standard Test Conditions*

All tests shall be performed under the following conditions, unless otherwise specified.

Ambient light:	225 lux
Viewing distance :	50 cm in front of LCD panel
Warrn up time	
All specifications:	30 minutes
Fully functional:	5 seconds
Measuring Equipment:	Chroma 2250 signal generator or equivalent, directly Connected to the monitor under test. Minolta CA100 photometer, or equivalent
Control settings	
User brightness control:	Maximum (unless otherwise specified)
User contrast control:	Typical (unless otherwise specified)
User red/white balance, Green/white balance and Blue/white balance control:	In the center (unless otherwise specified)
Power input :	110Vac or 230Vac
Ambient temperature :	20 ± 5 ˚C (68 ± 9 ˚ F)
Analog input mode :	1280 x1024 /60 Hz

2.1.1 MEASUREMENT SYSTEMS

The units of measure stated in this document are listed below:

1 gamma = 1 nano tesla
1 tesla = 10,000 gauss

cm = in x 2.54
lb = kg x 2.2

degrees F = [°C x 1.8] + 32
degrees C = [°F - 32]/1.8

u' = 4x/(-2x + 12y + 3)
v' = 9y/(-2x + 12y + 3)

x = (27u'/4)/[(9u'/2) - 12v' + 9]
y = (3v')/[(9u'/2) - 12v' + 9]

nits = cd/(m^2) = Ft-L x 3.426
lux = foot-candle x 10.76

2.2 LCD monitor General specification

Panel Type : 19 “ active matrix color TFT LCD

1). FUJITSU FLC48SXC8V

Display size : 376.32mm(H) x 301.056mm(V)

Display mode :	VGA	720 X 400 (70 Hz)
	VGA	640 X 480 (60/66/70/72/75 Hz)
	SVGA	800 X 600 (60/70/72/75 Hz)

	XGA 1024 X 768 (60/70/75 Hz)
	SXGA 1280 X 1024 (60/70/75 Hz) standard resolution
Pixel pitch :	0.098x3mm(H) x 0.294mm(V)
Display Dot :	1280 x (RGB) x 1024
Pixel Clock :	25.2 – 135.0MHz
Contrast ratio: $\theta = 0^\circ$	500 : 1 (typical)
Brightness:	250 cd/m^2 (typical)
Response time (Tr/Tf) :	15 /10 msec
Display color :	16777216 (8 bite color)
Viewing angle: L / R	85 / 85 (170 degrees horizontal typical)
U / D	85 / 85 (170 degrees vertical typical)
Luminance Uniformity :	> 70 %
Pc interface: 1). Video :	RGB analog 0.7V peak to peak
Sync :	TTL positive or negative
2). Digital TMDS	
Signal connector :	15 pin Mini D type, (standard VGA video)
	DVI-D connector
Front control :	power on/off with LED select (up, down) adjustment (+,-)

Interface frequency

- Horizontal Frequency 24KHz --80KHz(analog), 31.5– 80KHz(digital)
- Vertical Frequency 56Hz ----75Hz

Plug & play :	Support VESA DDC2B functions
Power Input voltage :	Single phase, 50/60HZ, 100VAC to 240VAC ±10%
Total output power :	60 Watt max.

2.3 LCD Panel Specification

2.3.1 LCD Panel Model (FUJITSU FLC48SXC8V)

- Display Type active matrix color TFT LCD
- Resolution 1280 x 1024 pixels
- Display Dot 1280 x (RGB) x 1024
- Display Area 376.32mm(H) x 301.056mm(V)
- Pixel Pitch 0.098x3mm(H) x 0.294mm(V)
- Display Color 16777216

- Lamp Voltage 700 Vrms typ.
- Lamp Current 7mA rms.(typ). 4 Lamp
- Weight 3200g .
- Optical Specifications

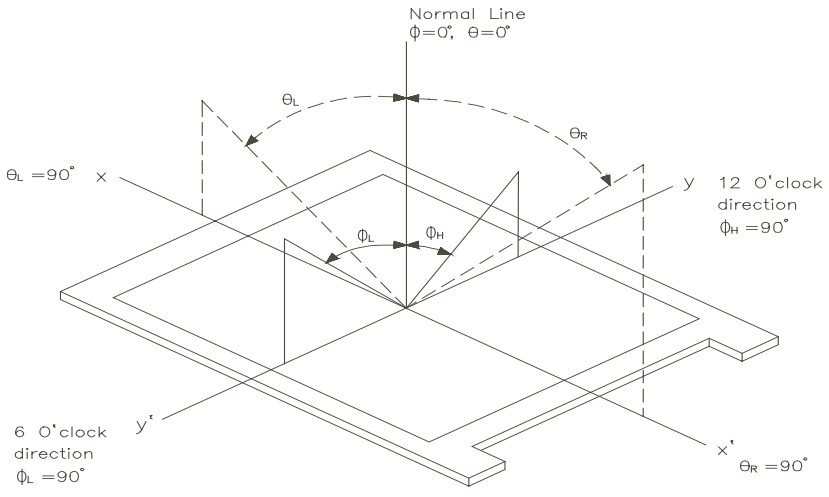
  The following items are measured under stable conditions. The optical characteristics should be measured in a dark room or equivalent state with the methods shown in Note(4).

  ◆Measuring equipment : TOPCON BM-5A, BM-7, PHOTO RESEARCH PR650

(Inverter Freq. : 54kHz) *Ta =25 ± 2°C, VDD=5V, fv=60 Hz, fDCLK=54 MHz, IL= 6.5mArms

Item		Symbol	Condition	Min.	Typ.	Max.	Unit	Note
Contrast Ratio (Center of screen)		CR	Normal $\phi = 0^\circ$ $\theta = 0^\circ$ Viewing Angle	T.B.D	500	-		(1)(2)(4) BM-5A
Response Time	Rising	T_R		-	15	30	msec	(1)(3) BM-7
	Falling	T_F		-	10	25		
Luminance of White (Center of screen)		Y_L		200	250	-	cd/m2	(5) BM-5A
Color Chromaticity (CIE 1931)	Red	Rx		TYP. -0.03	0.648	TYP. +0.03		(1)(4) PR650
		Ry			0.346			
	Green	Gx			0.292			
		Gy			0.602			
	Blue	Bx			0.150			
		By			0.130			
	White	Wx			0.313			
		Wy			0.329			
Viewing Angle	Hor.	θ_L	CR≥10	85	-	-	Degrees	(1)(4) BM-5A
		θ_R		85	-	-		
	Ver.	ϕ_H		85	-	-		
		ϕ_L		85	-	-		
Brightness Uniformity (9 points)		B_{UNI}		70	-	-	%	(6) BM-5A

Note 1) Definition of Viewing Angle: Viewing angle range (10≤CR)

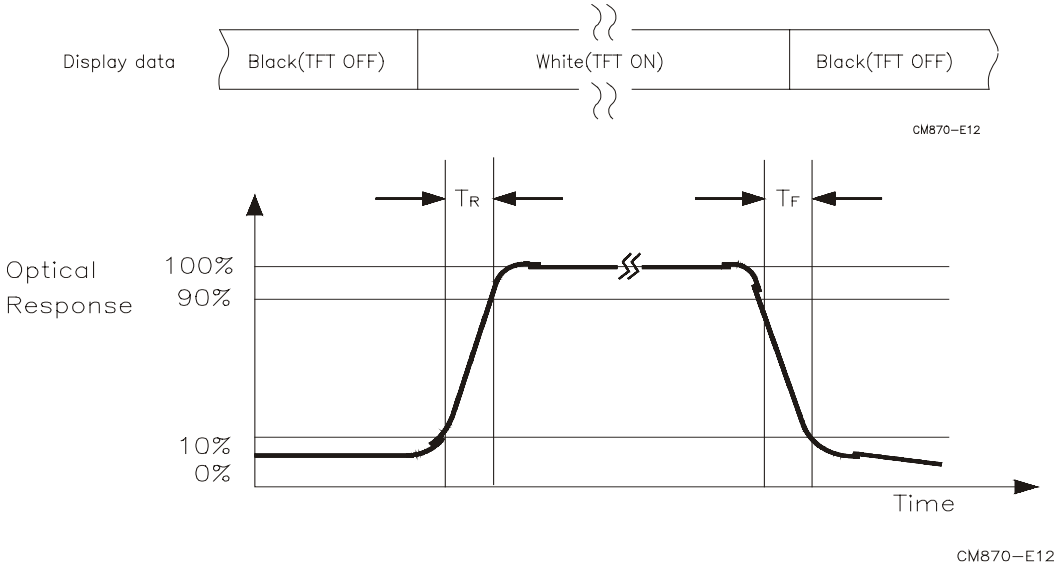


ST350-E01

Note 2) Definition of Contrast Ratio (CR): Ratio of gray max(Gmax),gray min(Gmin) at the center point of panel.

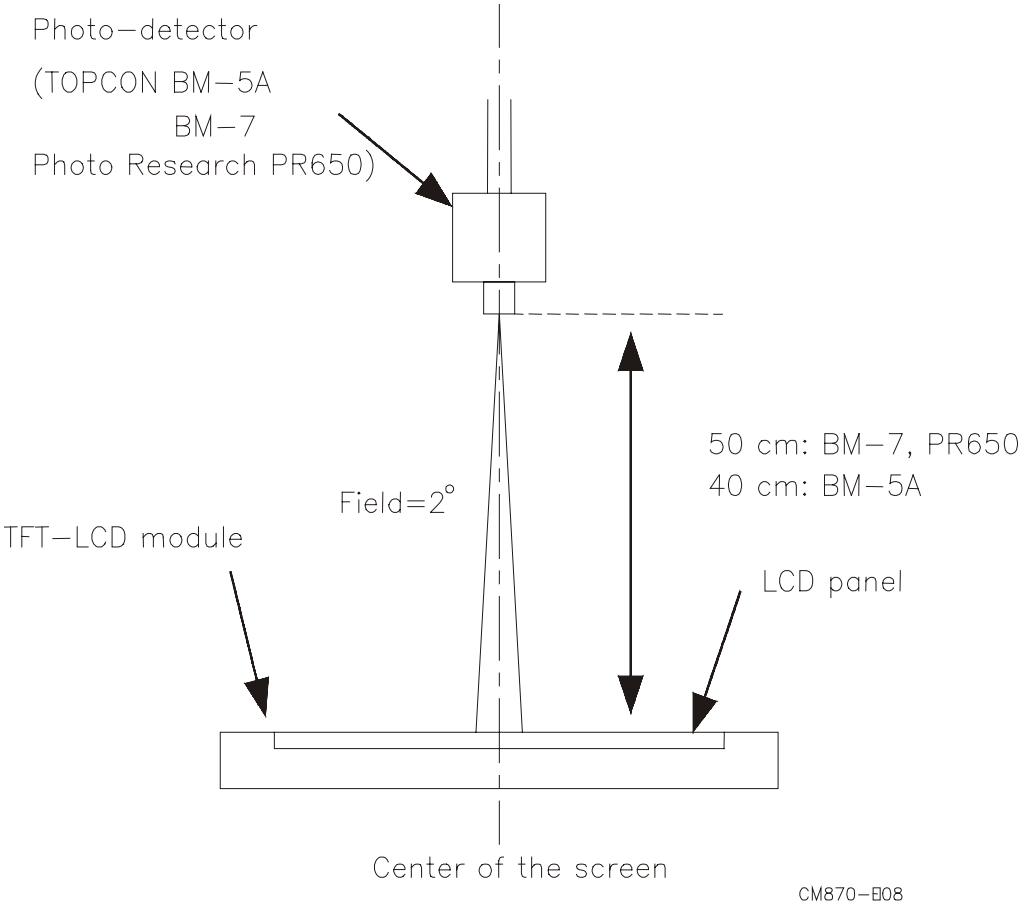
$$CR = \frac{\text{Luminance with all pixels white (Gmax)}}{\text{Luminance with all pixels black (Gmin)}}$$

Note 3) Definition of Response time: Sum of T_R , T_F



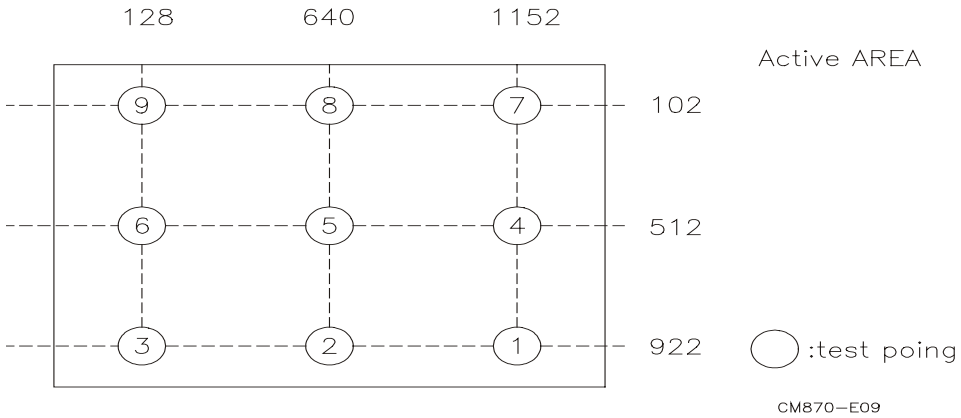
Note 4) After stabilizing and leaving the panel alone at a given temperature for 30 min, the measurement should be executed .Measurement should be executed n a stable, windless ,and dark room.30 min after lighting the back-light. This should be measured in the center of screen. Dual lamp current :13.0mA(6.5mA x2)(Refer to the note(1) in the page 14 for more information).

Environment condition :Ta=25±2°C



Optical characteristics measurement setup

Notes 5) Definition of Luminance of White : measure the luminance of white at center point.



Notes 6)Definition of 9 points brightness uniformity (Measuring points: Refer to the Note 5)

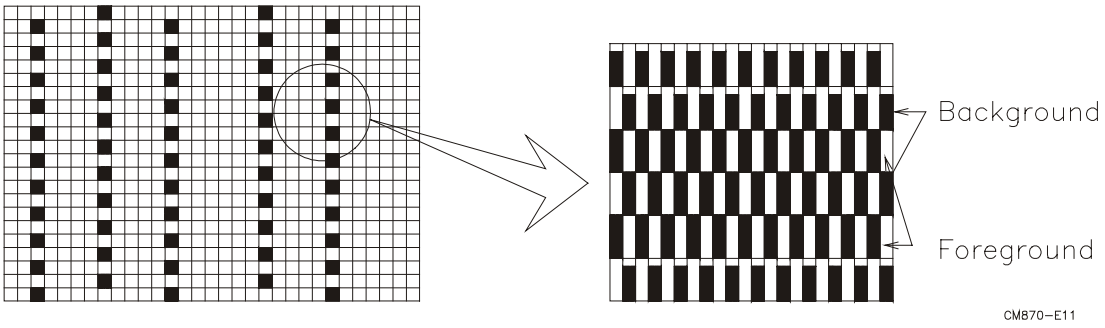
$$B_{UNI} = 100 * \frac{Bmin}{Bmax}$$

Bmax: Maximum brightness
Bmin: Minimum brightness

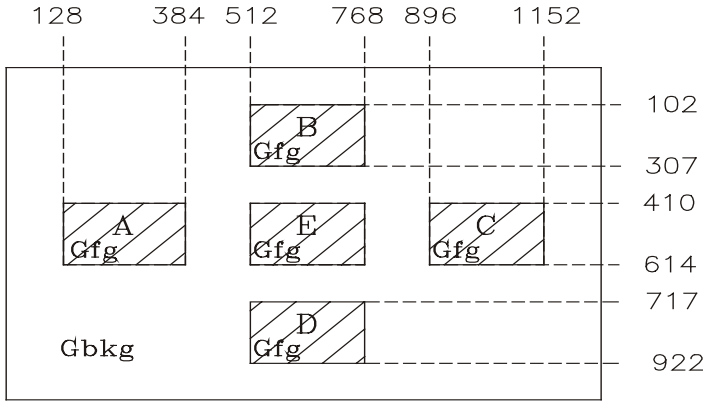
Notes 7) Definition of Flicker level

$$F = \frac{\text{Flicker Voltage}_{pp}}{\text{LMD Voltage}_{dc}} \times 100\ \%$$

- One maximum value of three estimated values.
- For this test ,an LMD(Light Measurement Device)is needed with adequate response time to track any visible rate flicker component and with a voltage level output proportional To luminance intensity.
- Test Pattern: For dot inversion Driving(Gray levels of foreground dots on the test panel Are G22,G32,and G45)
- Test Point :Center point of the display area



Note 8) Definition of Crosstalk (Refer to the VESA STD)



The calculation for shadowing is made from the 2 luminance measurements Gbkg and Lsh, as follows:

$$C_T = \frac{\mathbf{Lmax - Lmin}}{\mathbf{Lmin}} \mathbf{x100\ \%}$$

Where Lmax is the larger value of Gbkg or Lsh , and Lmin is the smaller of the two.

- To determine background and foreground levels (colors),first set the background to any gray scale or color level suitable for shadowing determination.(Note that it may take several iterations of adjusting background level and box levels to determine the proper value for the background .Next display the box levels to determine the proper value for the background level. Look for shadowing in any direction from box E. Independently vary the gray level (or color) of the background and box E until the worst case shadowing is observed. This defines the background (Gbkg) and foreground (Gfg) levels to be maintained for the remainder of the test.

- One point only (the target) will be measured. To determine that point proceed as follows Using the background and foreground gray levels of step1 (Gbkg and Gfg). Turn on each box at a time. Look for the case with the worst shadowing. The box causing the worst case is the shadowing source, or Bsrc. Use Bsrc and the box opposite from it that lies directly in the shadow path. That is the target box, or Btgt. Note that box Eight be either Bsrc or Btgt, depending on the shadowing conditions, but typically Bsrc and Btgt will be a pair of opposite boxes, A&C or B&D. Btgt will only be displayed for aligning the LMD. It will be turned off for the actual measurement.

- The target box point (Btgt) will be measured with the source box (Bsrc) turned on then off. (Btgt is for alignment purpose only) Display the background only at level Gbkg. Display Btgt determined in step 2 above. Using the correct distance, angle, and measurement aperture, align the LMD to the center of the Btgt. Turn off Btgt. With Gbkg set to its proper level, measure the luminance (or color). Next,turn on the source box Bsrc. Again measure at the center point of Btgt (without Btgt present.). In this case the LMD will be measuring the shadowing level, Lsh.

2.4 Input Signals

2.4.1 Video input

- Type Analog R, G, B., Digital TMDS
- Input Impedance 75 ohm +/- 2%
- Polarity Positive
- Amplitude 0 - 0.7 +/- 0.05 Vp
- Display Color same as LCD panel

2.4.2 Sync input

- Signal separate horizontal and vertical sync, or composite sync which are TTL compatible
- Polarity positive and negative.

2.4.3 Interface frequency

The following frequency range is generalized by supported timing. If the entered mode does not match the supported timing the display optimization will not be assured.

- Horizontal Frequency 24KHz --80KHz(analog), 31.5– 80KHz(digital)
- Vertical Frequency 56Hz ---------75Hz

DISPLAY MODES

MONITOR MODE NO.	SCREEN RESOLUTION	HORIZONTAL SYNC RATE (kHz)	VERTICAL SYNC RATE (Hz)	VIDEO CLK (MHz)	STANDARD
1	640x350	31.5 +	70.0 -	25.0	VGA
2	640X400	24.83 -	56.4 -	21.05	NEC
3	640X400	31.5-	70.0+	25.0	VGA
4	640X400	31.5-	70.1-	25.19	NEC
5	640X480	31.5 -	60.0 -	25.0	Defacto
6	640X480	35.0-	66.67-	30.24	MAC
7	640X480	37.86-	72.80-	31.5	VESA
8	640X480	37.5-	75.0-	31.5	VESA
9	720X400	31.5 -	70.0 +	28.0	Text Defacto
10	832X624	49.72-	74.55 -	57.28	MAC
11	800X600	35.16+	56.25+	36.0	SVGA
12	800X600	37.8 +	60.0 +	40.0	VESA
13	800X600	48.07 +	72.18 +	50.0	VESA
14	800X600	46.87+	75.0+	49.5	VESA
15	1024X768	48.4 -	60.0 -	65.0	VESA
16	1024X768	53.96 +	66.13 +	71.66	XGA
17	1024X768	56.47 -	70.07 -	75.0	VESA
18	1024X768	60.0 +	75.0 +	78.75	VESA
19	1024x768	60.24-	75.02-	80.0	MAC-768
20	1280X1024	64.0 +	60.0 +	108.5	SXGA
21	1280X1024	80.0 +	75.0 +	135.0	Defacto

Supported Timing

TIMING	FH(KHZ) FV(HZ)	SYNC POLARITY	TOTAL (DOT/LINE)	ACTIVE (DOT/LINE)	SYNC WIDTH (DOT/LINE)	FRONT PORCH (DOT/LINE)	BACK PORCH (DOT/LINE)	PIXEL FOREQ.(MHZ)
640x350	31.469	+	800	640	96	16	48	25.175
VGA-350	70.087	–	449	350	2	37	60	
640x400	24.83	–	848	640	64	64	80	21.05
NEC PC9801	56.42	–	440	400	8	7	25	
640x400	31.469	–	800	640	96	16	48	25.175
VGA-GRAPH	70.087	+	449	400	2	12	35	
640x400	31.5	–	800	640	64	16	80	25.197
NEC PC9821	70.15	–	449	400	2	13	34	
640x480	31.469	–	800	640	96	16	48	25.175
VGA-480	59.94	–	525	480	2	10	33	
640x480	35.00	–	864	640	64	64	96	30.24
APPLE MAC-480	66.67	–	525	480	3	3	39	
640x480	37.861	–	832	640	40	16	120	31.5
VESA-480-72Hz	72.809	–	520	480	3	1	20	
640x480	37.5	–	840	640	64	16	120	31.5
VESA-480-75Hz	75	–	500	480	3	1	16	
720x400	31.469	–	900	720	108	18	54	28.322
VGA-400-TEXT	70.087	+	449	400	2	12	35	
832x624	49.725	–	1152	832	64	32	224	57.2832
APPLE MAC-800	74.55	–	667	624	3	1	39	
800x600	35.156	+	1024	800	72	24	128	36
SVGA	56.25	+	625	600	2	1	22	
800x600	37.879	+	1056	800	128	40	88	40
VESA-600-60Hz	60.317	+	628	600	4	1	23	
800x600	48.077	+	1040	800	120	56	64	50
VESA-600-72Hz	72.188	+	666	600	6	37	23	
800x600	46.875	+	1056	800	80	16	160	49.5
VESA-600-75Hz	75	+	625	600	3	1	21	
1024x768	48.363	–	1344	1024	136	24	160	65
XGA	60.004	–	806	768	6	3	29	
1024x768	53.964	+	1328	1024	176	16	112	71.664
COMPAQ-XGA	66.132	+	816	768	4	8	36	
1024x768	56.476	–	1328	1024	136	24	144	75
VESA-768-70Hz	70.069	–	806	768	6	3	29	
1024x768	60.023	+	1312	1024	96	16	176	78.75
VESA-768-75Hz	75.029	+	800	768	3	1	28	
1024x768	60.24	–	1328	1024	96	32	176	80
APPLE MAC-768	75.02	–	803	768	3	3	29	
1280x1024	64	+	1688	1280	112	48	248	108
VESA-1024-60Hz	60	+	1066	1024	3	1	38	
1280x1024	80	+	1688	1280	144	16	248	135
VESA-1024-75Hz	75	+	1066	1024	3	1	38	

If the input timing is not a supported timing listed above but within the supported frequency range (Horizontal: 80KHz,Vertical: 75Hz), this monitor will select a closest mode instead. But the display quality may not be optimized.

If the input timing over the supported frequency range, a message “Input Signal Out of Range” will be shown.

2.4.4 85Hz refresh rate Support

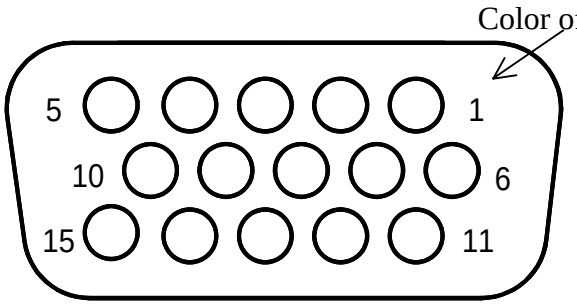
Monitor should display 85Hz refresh rate mode as emergency mode.
Monitor should display “Out of Range” warning menu at this mode.

2.4.5 Video input Connector

Analog Video input Connector: 15pins mini D-Sub

Table 2.4.5. Pin assignment for D-sub connector

PIN NO.	Separate Sync
1	RED VIDEO
2	GREEN VIDEO
3	BLUE VIDEO
4	GROUND
5	GROUND
6	RED GROUND
7	GREEN GROUND
8	BLUE GROUND
9	PC5V (+5V DDC)
10	CABLE DETECTION
11	GROUND
12	SDA
13	H.SYNC
14	V.SYNC
15	SCL



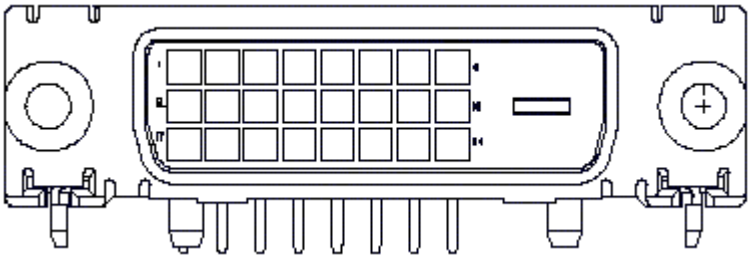
D-sub connector

Digital Video input Connector: DVI-D (T.B.D)

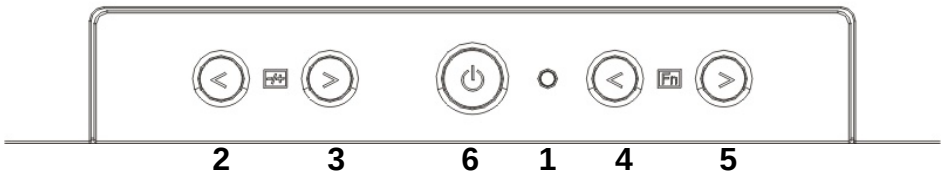
Table 4-3-3. Pin assignment for DVI-D (24pin) connector

Pin – Assignment of DVI –D connector :					
1	TX2-	9	TX1-	17	TX0-
2	TX2+	10	TX1+	18	TX0+
3	Shield (TX2 / TX4)	11	Shield (TX1 / TX3)	19	Shield (TX0 / TX5)
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC-Serial Clock	14	+5V power *)	22	Shield (TXC)
7	DDC-Serial Data	15	Ground (+5V)	23	TXC+
8	No Connect	16	Hot plug detect	24	TXC-

*) In case, the power of the PC unit is switched off and the power of the monitor is switched on, no voltage may occur at pin 14.



2.5 CONTROLS



2.5.1 Control panel (monitor front panel)

1. Power LED, will be green when monitor is on; be amber when in power saving mode.

2. Adjust decrease.

3. Adjust increase.

4. Function select counter-clockwise.

5. Function select clockwise.

6. Power ON/OFF switch, push to ON and push to OFF. (toggle switch)

Note: When OSD Menu is off, press button 2 and 3 at the same time can activate "Auto Adjustment" immediately.

2.5.2 OSD Functions

- OSD Format: Refer to following figure.
- OSD Border: Cyan color
- OSD Tunable Item: The 16 icons that around the border.
- Selected Item: Yellow background
- Comment: Magenta foreground, Blue background

page format :

Description:

- Brightness: Brightness adjustment, the range from 0 to 100.
- Contrast: Contrast adjustment, the range from 0 to 100.
- H. Position: Horizontal position adjustment.
- V. Position: Vertical position adjustment.
- Phase: Focus adjustment, the range from 0 to 31,32 steps.
- OSD position: OSD position adjustment.
- Auto Adjustment: This feature will automatically adjust size, position, clock and phase. It takes 3-5 seconds to finish. When auto start, it shows "Auto Adjusting…." message.
- Clock: Frequency tracking adjustment. The max range from -48 to +48, but some modes the range will be limited.
- Graph Text: 640x400(GRAPH) or 720x400(TEXT) mode select.
- Language: 5 kinds of language for description, including (English, German, French, Spanish, Italian)
- Recall: Recall the default value.
- Color Temp: Color temperature for standard 9300,6500, 7500 or user defined.
  - User:

    User R: Red signal gain by user defined.

    User G: Green signal gain by user defined.

    User B: Blue signal gain by user defined.
  - 7500: Set CIE coordinate at 7500°K color temperature.
  - 6500: Set CIE coordinate at 6500°K color temperature.
  - 9300: Set CIE coordinate at 9300°K color temperature.
- Exit: Exit OSD menu function.

Sharpness : Adjust the scale-up effect(smoother or sharper.)

OSD Transparency: Adjust the transparency level of OSD. The range is from 0 to 100 scales.

Comment:

- 1280x1024: Current mode resolution.
- 60 HZ: Current mode vertical frequency±1Hz.
- VER 1.00: Firmware revision.

- Other features:

  - Intellectual-Auto LCM999 can start the Auto-Adjustment automatically when input a new display mode at first time. After the adjustment, LCM999 will remember this mode and switch to optimized condition automatically for this mode whenever encounter this mode again. Total 21 recent used modes are recorded into LCM999.

  - VESA DPMS Functionality When signaled by the host CPU, LCM999 show a black screen about 3 seconds. If no further signal, then it shows "No Signal" and enter power saving mode.

2.6 White Color Temperature

White color temperature is 4 preset as 9300, 7500,6500 and User,
Default value of user color should be user which is maximum setting for panel.

Target of color setting

Color Temp.	Color Coordinate		Tolerance	Color Coordinate		Tolerance
	x	y		u'	v'	
9300K	0.281	0.311	±0.03	0.189	0.446	u'v' ≤ 0.01*
7500K	0.300	0.315	±0.03	0.194	0.459	u'v' ≤ 0.01*
6500K	0.315	0.325	±0.03	0.198	0.468	u'v' ≤ 0.01*
User	-	-		-	-	-

*) TCO'0X A.2.6.1 requirement

User should follow "Microsoft Windows Color Quality Specification for Liquid Crystal Display OEM's".
(http://www.microsoft.com/hwdev/tech/color/ColorTest.asp)

2.7 POWER SUPPLY

2.7.1 input Voltage Range

The monitor shall operate within specification over the range of 90 to 265 VAC power supply.

2.7.2 Input Frequency Range

Input power frequency range shall be from 47.5 to 63 Hz over the specified input voltage range.

2.7.3 Quick specification review

- Input current

  1.5A (max) at 90VAC input and full load ,
  0.75A (max) at 264 VAC input and full load.

- Inrush current @ cold start

  30A(0-peak)@ 110Vac ,50A(0-peak) @ 220Vac
  (measured when switched off for at least 10 mins.)

- Output

	Tolerance	Output Current		Volt Tolerance
Output Volt	-	MIN	MAX	
+12Vdc	±5%	0A	5A	11.4~12.6Vdc

- Total output power: 60 Watt max.
- Withstanding voltage : 1.5Kvac or 2.2KVdc for 1 minute.
- Leakage current : < 0.25mA/100Vac , <3.5mA/230Vac
- Efficiency : 80% min. @115V/230VAC, maximum load.

2.7.4 Power Management

2.7.4.1 Meet VESA DPMS proposal

The monitor must comply with the Microsoft On Now specification, with a minimum of three power management states, as defined by the VESA DPMS document. The front panel of the monitor must appropriately display the DPMS state, For example:

DPMS ON : The power LED is Green
DPMS OFF : The power LED is Amber

2.7.5 Power Consumption

On mode	54 Wmax	Green
Off mode	4 Wmax	Amber
DC power off	4 Wmax	Dark
disconnection	4 Wmax	Dark (DC power off) Amber (DC power on)

- ◆ Power saving states are measured with speakers attached but not worked.
- ◆ The recovery time from stand by /suspend/off mode to on mode is 3 seconds maximun.

2.7.6 Power Connector

All units shall have an IEC/CEE-22 type male power receptacle.

2.8 Plug & Play(EDID)

The monitor will be capable of sending a VESA standardized EDID file through the DDC (pins 12, 15 of the VGA connector).

3. VL-901 DISPLAY CONTROL BOARD

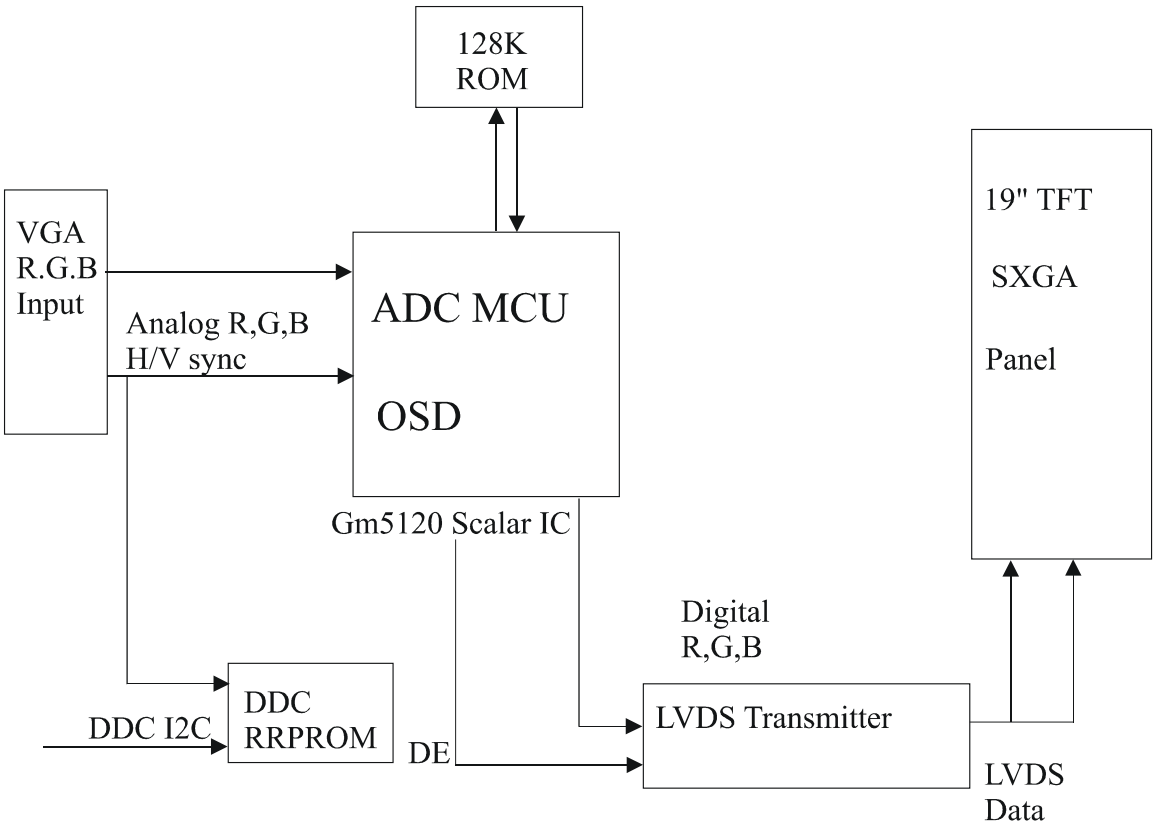
3.1 Description

The VL-901 display control board is design to directly convert the analog RGB signals from standard VGA display card to optimum LCD timing signals so as to construct a high display quality LCD monitor.

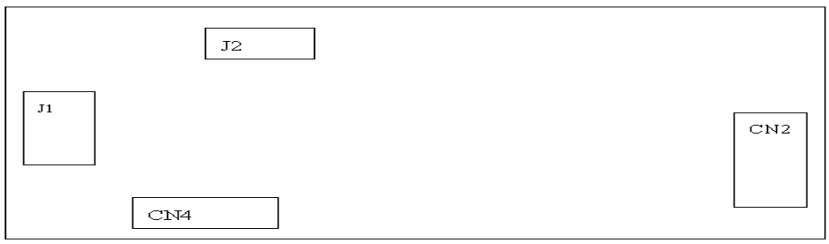
3.2 Features

- On board embedded micro-processor to detect display timings and control user functions.
- Using Genesis gm5120 design to generate optimum LCD timings.
- Using E^2PROM to memorize every adjusted parameter.
- support up to 22 display modes from VGA to SXGA.
- Offer full screen expansion function on non-SXGA mode (automatic).
- flexible color temperature selection function including 9300,6500,7500 and user mode.
- Support OSD functions.
- Support VESA DPMS function.
- Support DDC2B functions.
- Support 5 languages for OSD description.
- The longest time for mode change is 3 seconds.

3.3 BLOCK DIAGRAM



3.4 Connector Locations



CM999-E02

3.5 Connector Type

Location	Type	Maker	Number of pins
CN1	74320-4004	MOLEX	24
CN2	1211-15	E&T	15
CN4	6905-40	E&T	40
J1	4300-10	E&T	10
J2	4500-07	E&T	07

3.6 Connector pin assignment

3.6.1 CN2

Pin NO.	*Signal*	*Comment*
1	*R-Video*	*Red Video Input.*
2	*G-Video*	*Green Video Input.*
3	*B-Video*	*Blue Video Input.*
4	*N. C.*	
5	*Ground*	*Ground.*
6	*Ground*	*Ground.*
7	*Ground*	*Ground.*
8	*Ground*	*Ground*
9	*5VCC*	*DDC Power Input.*
10	*PCDETECT*	*PCDETECT Input.*
11	*NC*	*NC*
12	*SDA*	*DDC 2B*
13	*HS*	*Horizontal Sync Input.*
14	*VS*	*Vertical Sync Input.*
15	*SCL*	*DDC 2B*

3.6.2 CN4

Terminal No.	Symbol	Function
36,37,38	VDD	5V POWER SUPPLY
1	TXE0-	LVDS EVEN OUTPUT DATA PAIRS
2	TXE0+	LVDS EVEN OUTPUT DATA PAIRS
4	TXE1-	LVDS EVEN OUTPUT DATA PAIRS
5	TXE1+	LVDS EVEN OUTPUT DATA PAIRS
7	TXE2-	LVDS EVEN OUTPUT DATA PAIRS
8	TXE2+	LVDS EVEN OUTPUT DATA PAIRS
10	TXECLK-	LVDS EVEN OUTPUT DATA PAIRS
11	TXECLK+	LVDS EVEN OUTPUT DATA PAIRS
13	TXE3-	LVDS EVEN OUTPUT DATA PAIRS
14	TXE3+	LVDS EVEN OUTPUT DATA PAIRS
16	TXO0-	LVDS ODD OUTPUT DATA PAIRS
17	TXO0+	LVDS ODD OUTPUT DATA PAIRS
19	TXO1-	LVDS ODD OUTPUT DATA PAIRS
20	TXO1+	LVDS ODD OUTPUT DATA PAIRS
22	TXO2-	LVDS ODD OUTPUT DATA PAIRS
23	TXO2+	LVDS ODD OUTPUT DATA PAIRS
25	TXOCLK-	LVDS ODD OUTPUT DATA PAIRS
26	TXOCLK+	LVDS ODD OUTPUT DATA PAIRS
28	TXO3-	LVDS ODD OUTPUT DATA PAIRS
29	TXO3+	LVDS ODD OUTPUT DATA PAIRS
03,06,09, 12	GND	Ground
15, 18, 21, 24	GND	Ground
27, 30, 34, 35	GND	Ground
39,40	GND	Ground

3.6.3 J2

Pin NO.	*Signal*	*Comment*
1,2	*5 VCC*	*5V Power Input*
3,4,5	*GND*	*GND*
6	*BLON*	*Bright Light ON/OFF.*
7	*BRIGHT*	*Brightness Adjustment.*

3.6.4 J1

Pin NO.	Signal	Comment
1	NC	NC
2	LED-Y	Power saving mode
3	LED-G	Monitor is ON
4	GND	GND
5	KEY-POWER	Power ON/OFF key
6	KEY-DOWN	Function select counter-clockwise key
7	KEY-R	Adjust up key
8	KEY-L	Adjust down key
9	KEY-UP	Function select counter-clockwise key
10	GND	GND

3.6.5 CN1 Digital Video input Connector: DVI-D

Pin-Assignment of DVI-D(24 pin) connector					
1	TX2-	9	TX1-	17	TX0-
2	TX2+	10	TX1+	18	TX0+
3	Shield (TX2 / TX4)	11	Shield (TX1 / TX3)	19	Shield (TX0 / TX5)
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC-Serial Clock	14	-5V Power *)	22	Shield (TXC)
7	DDC-Serial Data	15	Ground (+5V)	23	TXC-
8	No Connect	16	Hot plug detect	24	TXC+

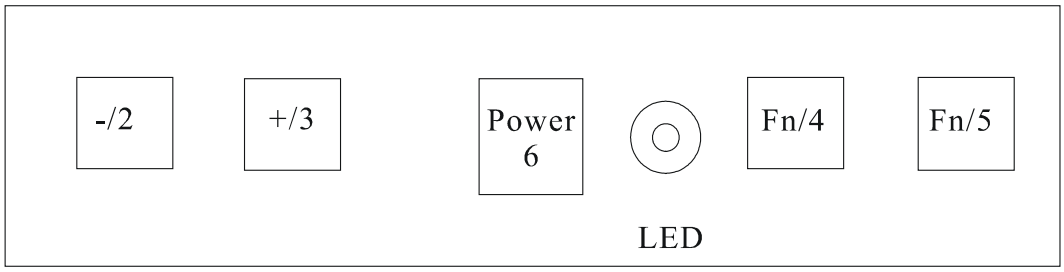
*)In case, the power of the PC unit is switched off and the power the monitor is switched on, no voltage may occur at pin 14.

4. VK901 Control Panel Board

4.1.1 Description

The VK-901 is designed to offer a user interfaced control panel which passes and receives signals to and from VL-901 display control board.

4.1.2 Connector and Switch Locations



4.1.3 Connector type

Location	*Type*	*Maker*	*Number of pins*
J1	*4500-10*	*E&T*	*10*

4.1.4 Connector pin Assignment

4.1.5 J1

Pin NO.	*Signal*	*Comment*
1	*NC*	*NC*
2	*LED-Y*	*Power saving mode*
3	*LED-G*	*Monitor is ON*
4	*GND*	*GND*
5	*KEY-POWER*	*Power ON/OFF key*
6	*KEY-DOWN*	*Function select counter-clockwise key*
7	*KEY-R*	*Adjust up key*
8	*KEY-L*	*Adjust down key*
9	*KEY-UP*	*Function select counter-clockwise key*
10	*GND*	*GND*

4.1.6 Switch definition

Location	*Definition*
S5	*Power ON/OFF*
S1	*Function select by clockwise direction*
S4	*Function select by counter-clockwise direction*
S3	*Adjust up*
S2	*Adjust down*

4.1.7 LED definition

Location	*Definition*
D1	*Green for ON mode; Yellow for OFF mode; yellow for Power Saving mode; Dark for DC power OFF mode.*

5. INVERTER BOARD

5.1 Description

The Inverter board is designed for lighting up the back-lights of LCD module.

5.2 Electrical characteristics

5.2.1 FOR Fujitsu PANEL FLC48SXC8V

	MIN.	TYP.	MAX.	COMMENT
INPUT VOLTAGE	11.4V	12.0V	12.6V	12V±5%
INPUT CURRENT	--------	2A	_	Vin=12V, Vbrite=3.3V
Normal BACKLIGHT VOLTAGE	--------	700V rms.	--------	
LAMP CURRENT	--------.	7mA rms	8mA rms	Total two lamps for Unipac
DRIVING FREQUENCY	KHz	50KHZ	KHz	
EFFICIENCY	--------	80%	--------	Vin = 12V,max brightness
Vin ON/OFF sequence	--------	1^s	--------	
OLP TIME	--------	3S	_	Open lamp protection time
BRIGHTNESS RANGE	10%	--------	100%	
Brightness control	0V	_	3.3V	0V, brightness max
Brightness	_	220cd/m^2	_	
Strike voltage at 0°C	1600 Vrms	_	_	
Operating life time	20,000 hrs	_	_	(note)

Note:

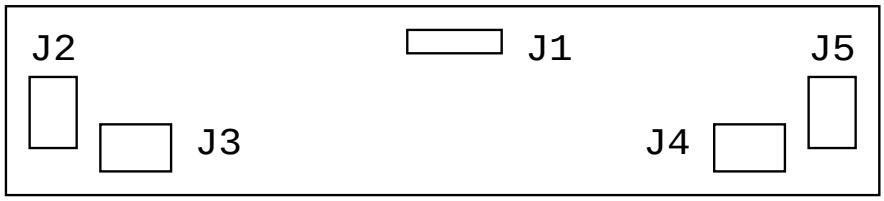
Life time (hr) can be defined as the time in which it continues to operate under the condition:

Ta=25±2°C, IL =7 mArms until one of the following event occurs:

1. When the brightness becomes 50 %
2. When the startup voltage (Vs) at 0°C becomes higher than the maximal value of Vs specified above.

5.3 Connector locations

5.3.1 Connector type



CM999-E04

Location	Type	Maker	Number of pins
JN2, JN3, JN4, JN5	SM02 (8.0)B-BHS	ST	2
JN1	85205-1200	E&T	12

5.3.2 Connector pin assignment

5.3.2.1 J2,J3,J4,J5

Pin NO.	Signal	Comment
1	*HV*	*High voltage for lamp*
3	*LV*	*Low voltage (common)*

5.3.2.2 JN1

Pin NO.	*Signal*	*Comment*
1, 2, 3,4	*BP+*	*+12V*
7	*BLT_ON*	*Back-light ON/OFF control, high active (3.3V)*
5, 6, 10, 11, 12	*GND*	
8	*+5VS*	*+5VS*
9	*BRITE*	*BRITE Brightness (0-3.3V) control from I/F 3.3 V for max. brightness (for Fujitsu model)*

6. DC/DC POWER and Audio CKT VM-902

6.1 Input:

+12V/5A from AC adapter

6.2 Output:

ITEM	Output Voltage	Max Load.	Min Load	Tolerance	Ripple & Noise(max)
VCC	+5V	2.1A	0.1A	±5 %	200mVpp

6.3 Efficiency: 80 % min at Maximum Load.

6.4 Connector Locations

6.4.1 Connector type for VM-902

Location	Type	Maker	Number of pins	
J801	DC-IN	SC	2	
J802	4500-12	E&T	12	
J803	4500-07	E&T	7	(for LCM999 only)
J2	4500-11	E&T	11	

6.4.2 Connector pin Assignment

6.4.3 J801 DC 12V Input

Pin No	Signal	Comment
Pin 1	+12V	From adapter output cable
Pin 2	GND	From adapter output cable

6.4.3.1 J802 FOR I/F CKT

Pin No	Signal	Comment
Pin 1,2,3,4	+12V	From adapter +12V power
Pin 5,6,10,11,12	GND	GND
Pin 8	+5V	Supply for I/F CKT
Pin 7	ON/OFF	ON/OFF Control ON>3.0V OFF <2.0V
Pin 9	BRIGHT	Lamp Current Control (0V to 3.3V) , 3.3V for max brightness

6.4.3.2 J803 FOR M/B CKT

Pin No	Signal	Comment
Pin 1,2	+5V	For M/B +5V power
Pin 3,4,5	GND	GND
Pin 6	BLON	Bright Light On/ Off
Pin 7	BRIGHT	Brightness Adjustment

6.4.3.3 J3 FOR Audio input(for CM999 only)

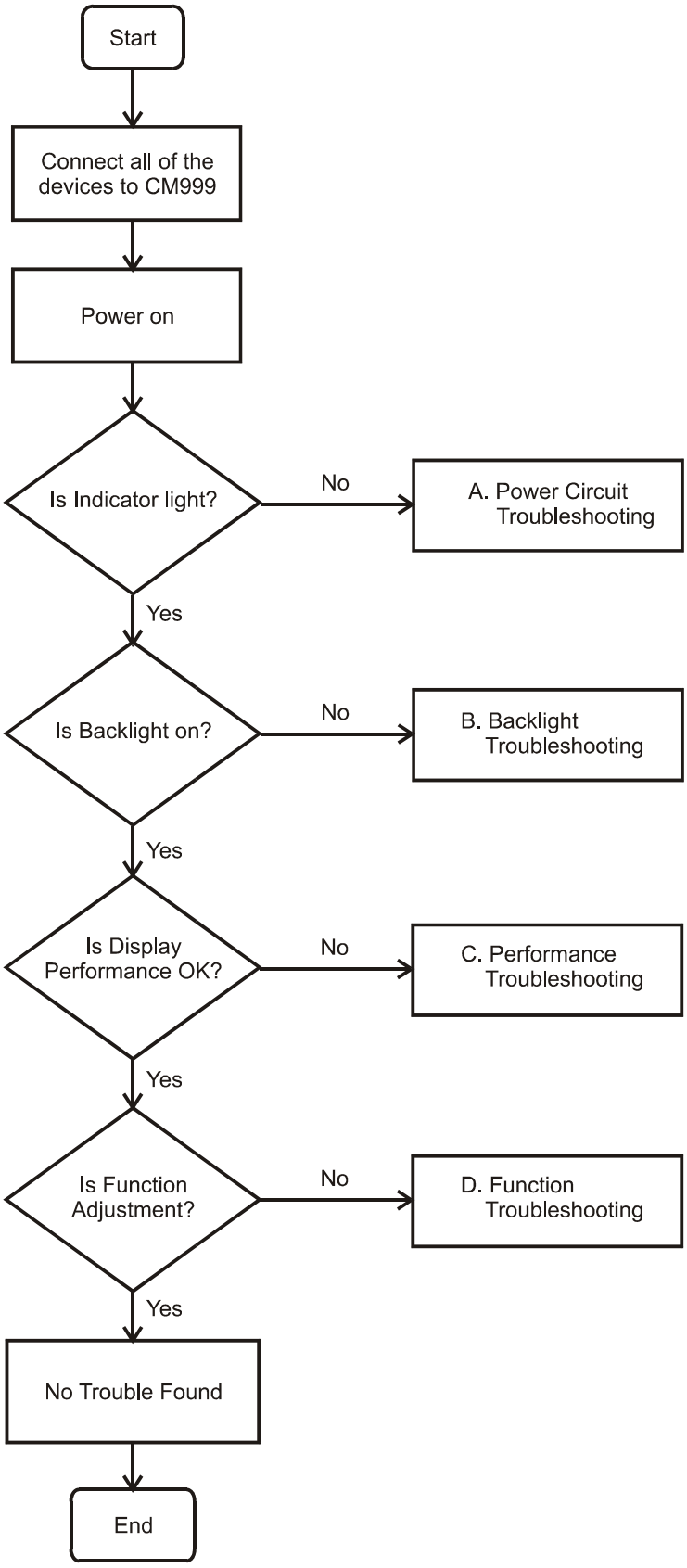
Pin No	Signal	Comment
Pin 1	GND	GND
Pin 2	Audio IN (1)	From Audio output (1)
Pin 3	Audio IN (2)	From Audio output (2)

6.4.3.4 J2 TO Speaker CKT(for CM999 only)

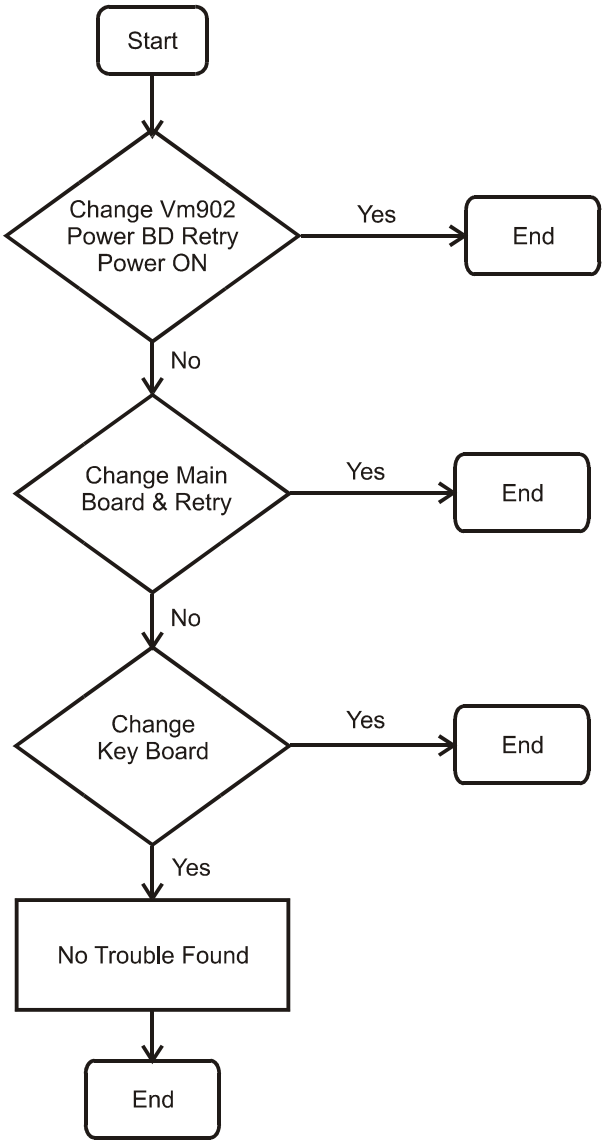
Pin No	Signal	Comment
Pin 1	VOL	Volume ON/OFF control
Pin 2	GND	GND
Pin 3	RIN1	Audio volume adjust line INR
Pin 4	LIN1	Audio volume adjust line INL
Pin 5	RIN2	Audio volume adjust line OUTR
Pin 6	LIN2	Audio volume adjust line OUTL
Pin 11	GND	
Pin 7	R-EAR	EAR phone out R
Pin 8	L-EAR	EAR phone out L
Pin 9	ROUT	Speaker out R
Pin 10	LOUT	Speaker out L

7. TROUBLESHOOTING

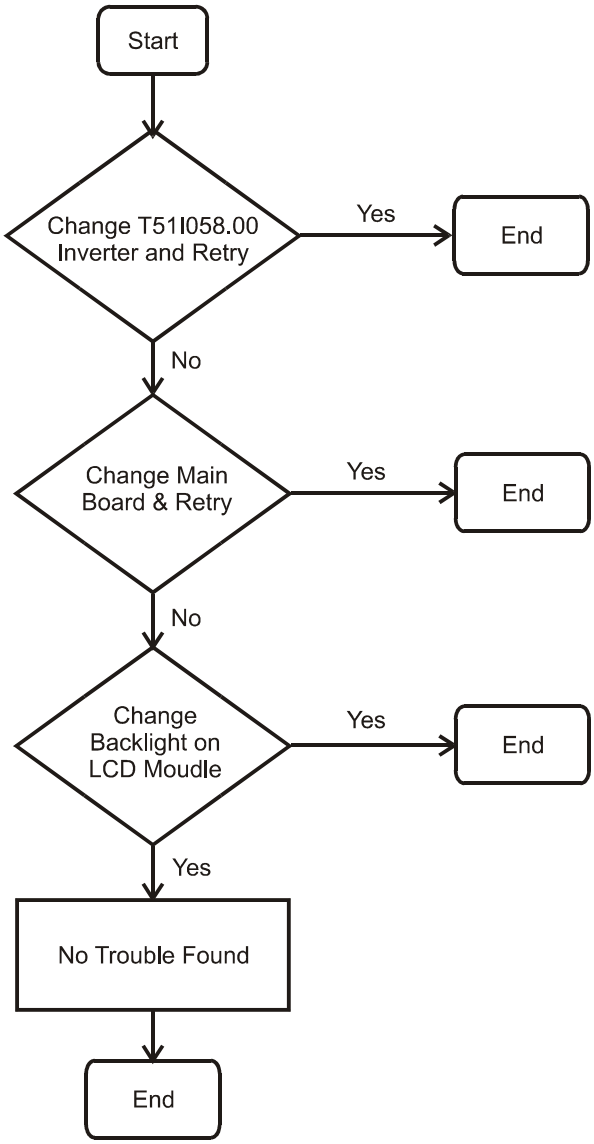
7.1 Main Procedure



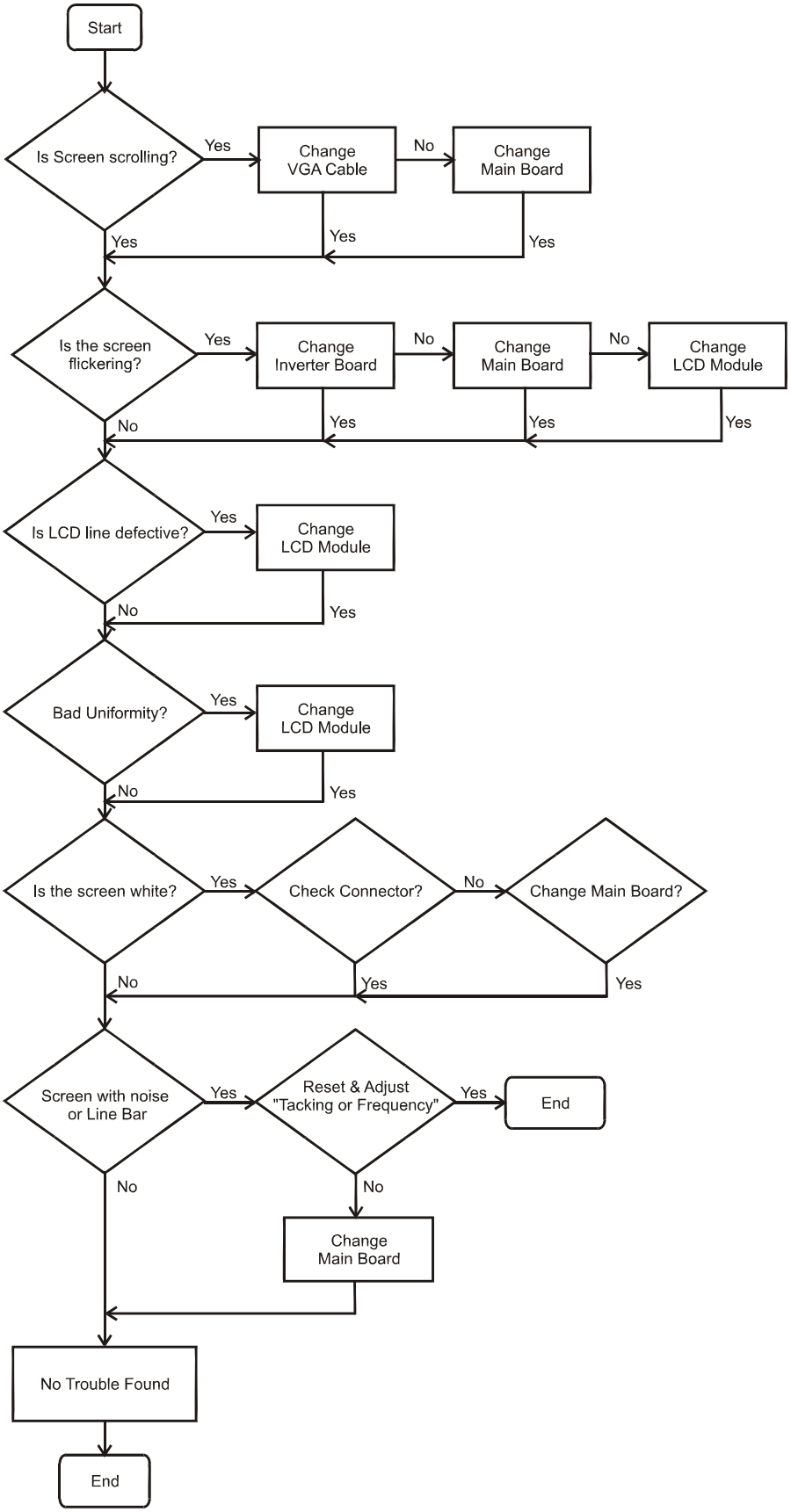
7.1.1 Power Circuit Troubleshooting



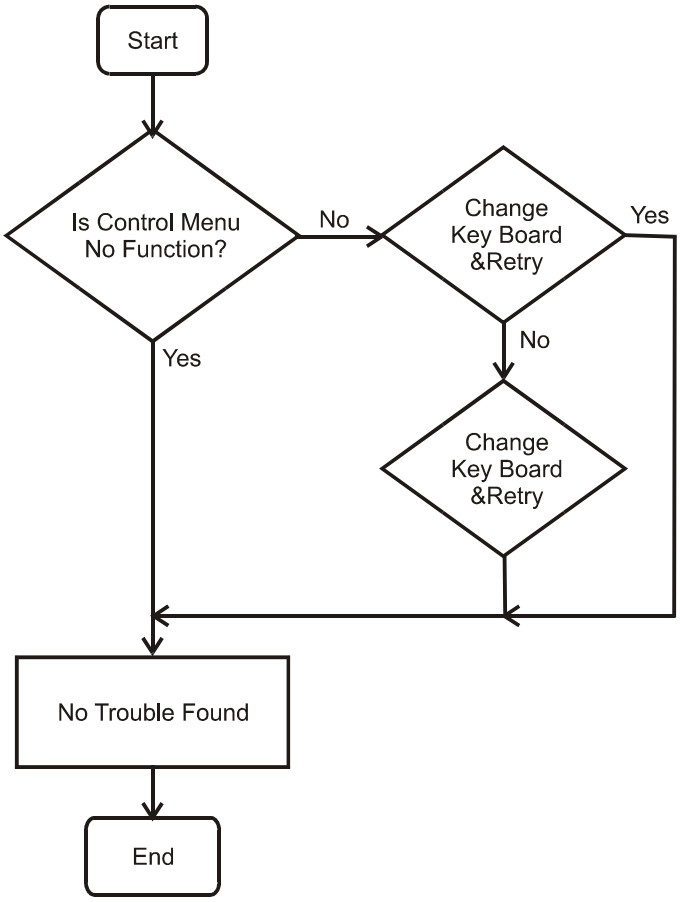
7.1.2 Backlights Troubleshooting



7.1.3 Performance Troubleshooting



7.1.4 Function Troubleshooting



8. MECHANICAL REQUIREMENTS

8.1 Vibration and Shock

All testing shall be done in each of three mutually perpendicular axes, referenced to the position of the system as it is in front of the user (i.e., front-to back, side-to-side, and top-to-bottom).

8.1.1 Non-Operating

The unit should suffer minimal visible cosmetic damage or damage that presents a safety hazard, or impairs the setup and operation of the system after testing.

Sinusoidal Vibration: 0.75 G zero-to-peak, 10 to 500Hz, 0.5 octave / minute sweep rate. This requires one sweep, 10 to 500 to 10Hz, along each of the three axes.

Random Vibration: 0.008 G^2/Hz, 10 to 500 Hz, nominal 2 GRMS. The test shall be for one hour for each of the three axes.

Half Sine Wave Shock: 120 G peak, half sine pulse, 2 ms pulse duration. Testing shall consist of one shock in each direction in each axis, for a total of 6 shock inputs.

Square Wave Shock: 40 G peak acceleration, 160 inches / second velocity change. There shall be one shock in each direction in each axis, for a total of 6 shock inputs.

8.2 Package Drop Specification

Listed below are standards of drop heights for monitor product

Product Weight	height Specs
<9.1 kg	0.76 m
9.2~18.2 kg	0.66 m
18.3~27.2 Kg	0.61 m
27.3~45.4 Kg	0.46 m

8.2.1 Drop Test Sequence

Drop Order	*Drop point*	*Drop Times*
1	*Right Front Bottom Corner*	*1*
2	*Right Bottom Edge*	*1*
3	*Right Front Edge*	*1*
4	*Front Bottom Edge*	*1*
5	*Bottom Side*	*1*
6	*Top Side*	*1*
7	*Front Side*	*1*

8	*Back Side*	*1*
9	*Left Side*	*1*
10	*Right Side*	*1*

8.3 Dimension Size and Weight

Dimension size	433 (W) x 447 (H) x 235 (D)
Net Weight	6.5Kg
Gross Weight	8.5Kg

8.4 Gap Spec.

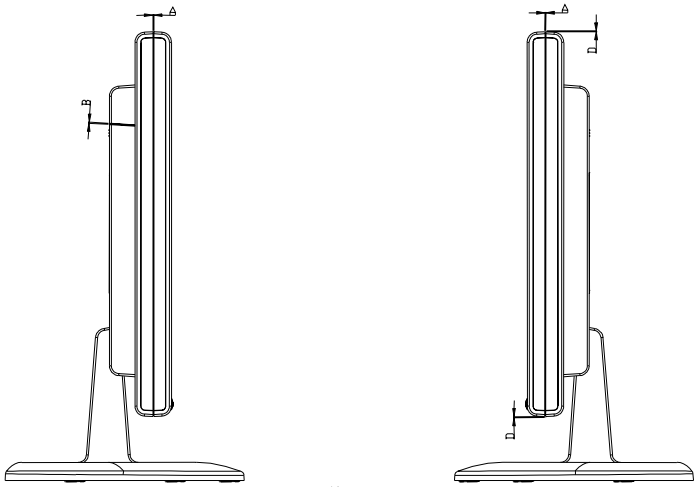
8.4.1 The step between front bezel and back cover shall be within specification.

Back Cover & Bezel Gap

0.8 mm ≤ A ≤ 1.2 mm

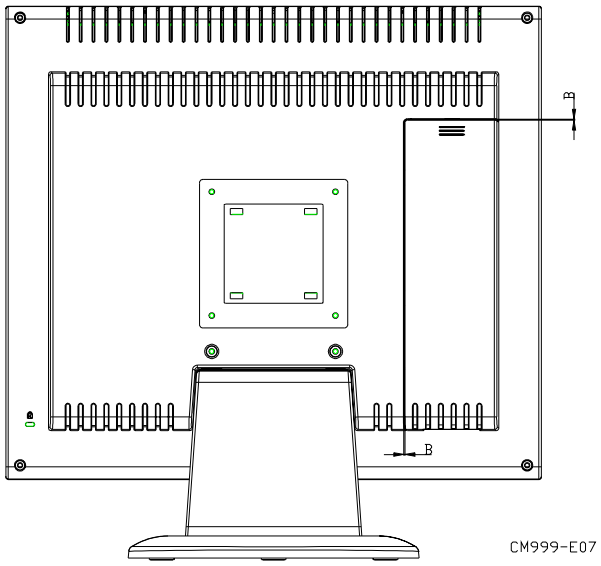
Back Cover & Bezel Alignment

0 mm ≤ D ≤ 0.8 mm



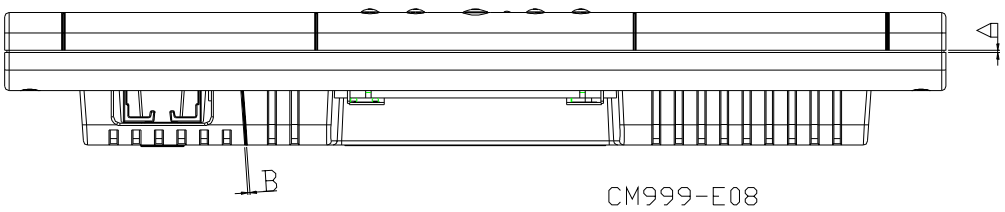
Back Cover & Cable Cover Gap

0.8 mm ≤ B ≤ 1.2 mm



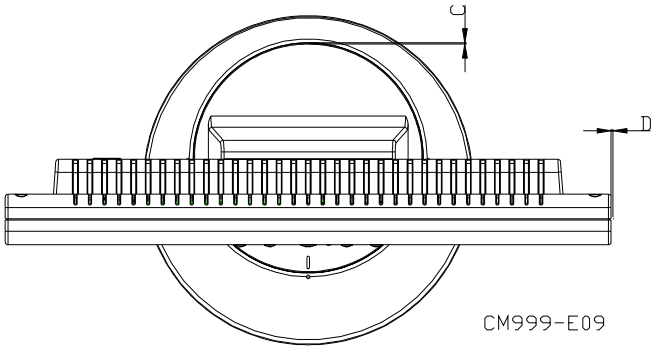
Back Cover & Cable Cover Gap

0.8 mm ≤ B ≤ 1.2 mm



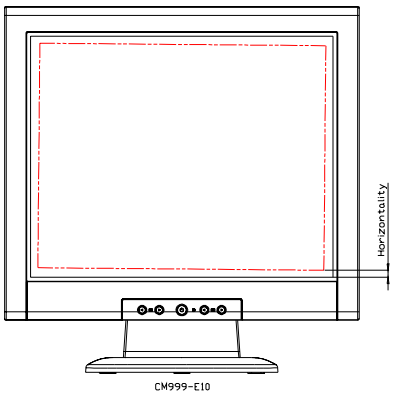
Base Cover & Neck Cover Gap

0.8 mm ≤ C ≤ 1.2 mm

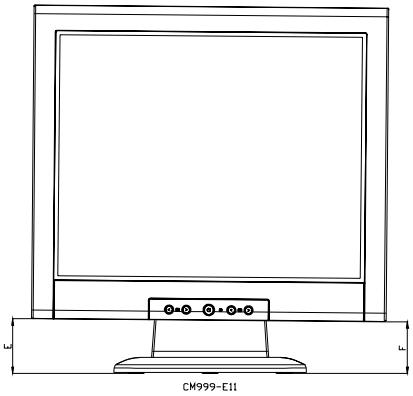


8.4.2 LCD Horizontally

The angle between front bezel and LCD unit in bottom side should not be larger than 1.0mm.



The distance of the LCD display unit from left side to right should not be larger than E - F <=4.0mm.



Tilt Base Rotation

Tilt up 25 ± 1°/ down 5 ±1°

8.5 Swivel Base Rotation

Swivel Right 45 ±1° / Left 45 ±1°

8.6 Plastic Material

Front Bezel ABS 94HB, 94V-0

Back Cover ABS 94HB, 94V-0

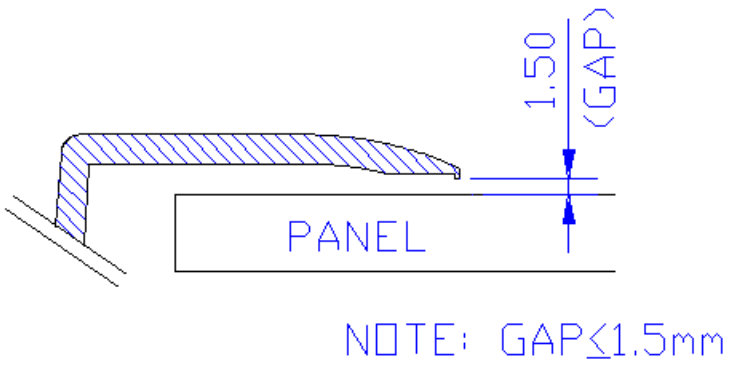
The Others ABS 94HB

TCO' 99(Optional)

Front Bezel	PC + ABS 94 - V0
BACK COVER	PC + ABS 94 – V0
The others	ABS 94 HB

8.7 GAP Spec.

Gap between panel with bezel is 0 mm < gap < 1.5 mm



CM999

9. Power Line Transient Test (IEC 61000-4-4 Fast Transients/Burst)

TEST CONDITIONS & PROCEDURE: (Follow IEC 61000-4-4)

Test Condition :

The condition is based on operating with 50Ω load.

9.1 Peak Voltage:

2 KV (applies the Level 3 typical Industrial Environment" of IEC 61000-4-4)

9.2 Polarity : + / -

9.3 Repetition Frequency of the impulse : 5 KHz.

9.4 Rise-Time : 5ns ±30%

9.5 Impulse Duration: 50 nS ±30%

9.6 Relation to Power Supply: Asynchronous

9.7 Burst Duration: 15 ms ±20%

9.8 Burst Period: 300 ms ±20%

9.9 Climatic Conditions:

- Ambient Temperature: 15°C to 35°C
- Relative Humidity: 45% to 75%
- Atmospheric Pressure: 86 kPa to 106 kPa

9.10 Test Procedure:

The monitor Display set high-resolution mode, AC input use AC 240V.

Note :

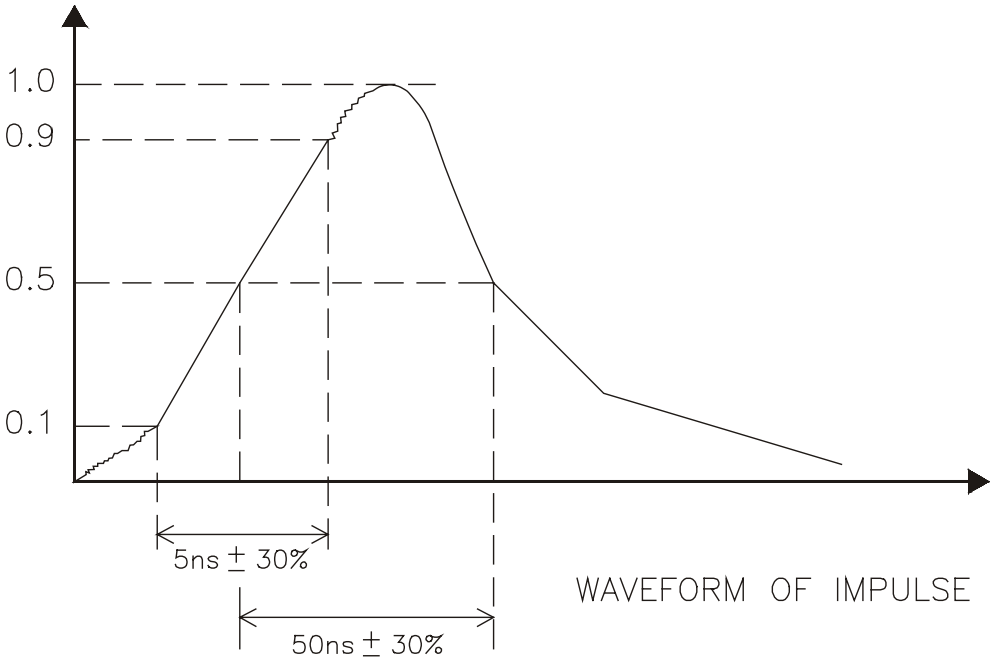
9.10.1

IEC 61000-4-4 defines that power supply, I/O line, and control line all shall be performed the transient test, but the I/O line and control line is applied with only half of peak voltage (1 KV).

9.10.2

For the comparison of wave-shape generated by different generator, so the test must uses a scope with at least 400 MHz bandwidth, and coupled to 50 Ω to monitor the rise-time, impulse, duration, and repetition rate of the impulses within one burst.

WAVESHAPE



WAVEFORM OF IMPULSE

CM870–E06

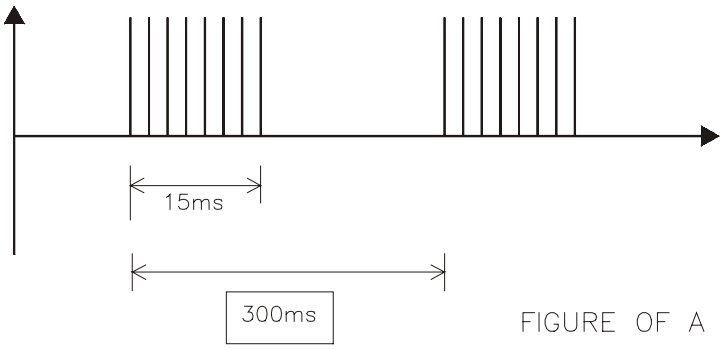


FIGURE OF A FAST TRANSIENT/BURST

CM870–E07

10. Power Line Surge Test (IEC 61000-4-5 Surge)

10.1 Climatic Condition

The climatic conditions shall be within the following ranges:

10.1.1 Ambient Temperature: 15℃ to 35℃

10.1.2 Relative Humidity: 10% to 75%

10.1.3 Atmospheric Pressure 86kPa(860 mbar)to 106kPa (1060mbar)

Note: The temperature and relative humidity should be recorded in the test report.

10.2 Test Conditions:

10.2.1 Wave-shape of the current surge: (refer to IEC 61000-4-5)

Open circuit voltage: (1.2 / 50 μs)

Short circuit current: (8 / 20 μs)

10.2.2 Polarity: positive / negative

10.2.3 Phase shifting:in a range between 0º to 270º versus the AC line phase angle

10.2.4 Repetition rate:at least 1 per minute

10.2.5 Number of tests: at least 5 positive and 5 negative at the selected points.

10.3

The surge will be applied between lines and between lines and ground.

10.4

If not otherwise specified, the surge to power supply circuits shall be applied synchronized to the voltage phase at the zero crossing and the peak value of the AC voltage wave. (Positive and negative)

10.5

The surge voltage for test is from 1 KV and increases 1 kV for each step.

10.6

The recommended severity levels for the surge voltage test is 2.0 KV, and without any degradation or loss of function that is not recoverable due to damage of component or software allowed.

10.7 Display set high-resolution mode, AC input use AC 240V**.**

11. ENVIRONMENTAL REQUIREMENTS

11.1 Operating

Temperature	5°C ~ 40°C
Relative Humidity	20% to 80%
Altitude	Sea level to 8000ft

11.2 Storage or Shipment

Temperature	-20°C ~ +60°C
Relative Humidity	5% to 85%
Altitude	Sea level to 40,000ft

11.2.1 TEST PROCEDURE:

- Put in temperature chamber under 60°C Time:24 hours
- Back to room temperature Time: 4 hours
- Put in temperature chamber under -20°C Time:24 hours
- Back to room temperature Time:4 hours
- The process repeat 2 times.

12. REGULATION COMPLIANCE

12.1 This product comply to the most current revisions of following regulations:

UL/CUL {UL 1950/ CSA C22.2 NO950}	Standard for Safety of Information Technology Equipment including Electrical Business Equipment
EN 60950/CB Scheme	Safety of Information Technology Equipment including Electrical Business Equipment
MPR 1990:8	Test methods for visual display units.
MPR 1990:10	User handbook for evaluation visual display units.
ISO 9241-3:	Ergonomic requirements for office work with visual display terminals (VDTs)-Visual display requirements.
ISO 9241-7:	Ergonomic requirements for office work with visual display terminals (VDTs)-Requirements for display with reflections.
ISO 9241-8:	Ergonomic requirements for office work with visual display terminals (VDTs)-Requirements for displayed colours.
NUTEK/EPA	Requirements of power saving according to NUTEK Spec. 803299/94/96, EPA Energy star.
TCO 1999 (option)	Requirements for Environmental Labeling of Personal Computers. Test methods for Ergonomic, Emission, Energy Efficiency, safety.
TUV/GS	Safety regulation for displays work places in the office sector.
FCC 47 CFR, Chapter 1, Subchapter A, Part 15, Subpart B	A digital device that is marketed for use in a residential environment not withstanding use in commercial, business and industrial environments.
CISPR 22	Limits and methods of measurements of radio interference characteristics of information technology equipment.
CE LVD Directive (73/23/EEC)	Safety: EN60950
CE EMC Directive (89/336/EEC)	EMI: EN55022 class B Harmonics: EN61000-3-2 Voltage Fluctuation/Flicker: EN61000-3-3 Immunity: EN55024
IEC 61000-4	IEC 61000-4-2 Electrostatic Discharge IEC 61000-4-3 Radiated Electromagnetic Field IEC 61000-4-4 Fast Transients/Burst IEC 61000-4-5 Surge IEC 61000-4-6 Conducted Disturbance, Induced by Radio Frequency Fields IEC 61000-4-8 Power Frequency Magnetic Field IEC 61000-4-11 Voltage DIP/Interruption
VCCI (option)	Specification for limits and methods of measurement of radio interference characteristics of information technology equipment. Class B conformity verification report from the VCCI
BSMI (option)	CNS 13438, Class B

12.2 Electrostatics Discharge (ESD)

E.S.D Test

This test follow the IEC 61000-4-2

Discharge Voltage Level :

Criteria	Contact Discharge (KV)	Air Discharge(KV)
Class C	±4	±4
Class B	±6	±8
Class A	±8	±15

Class A **:** Temporary degradation or loss of function or performance which requires operator Intervention or system reset.

Class B **:** Temporary degradation or loss of function or performance which is self-recoverable

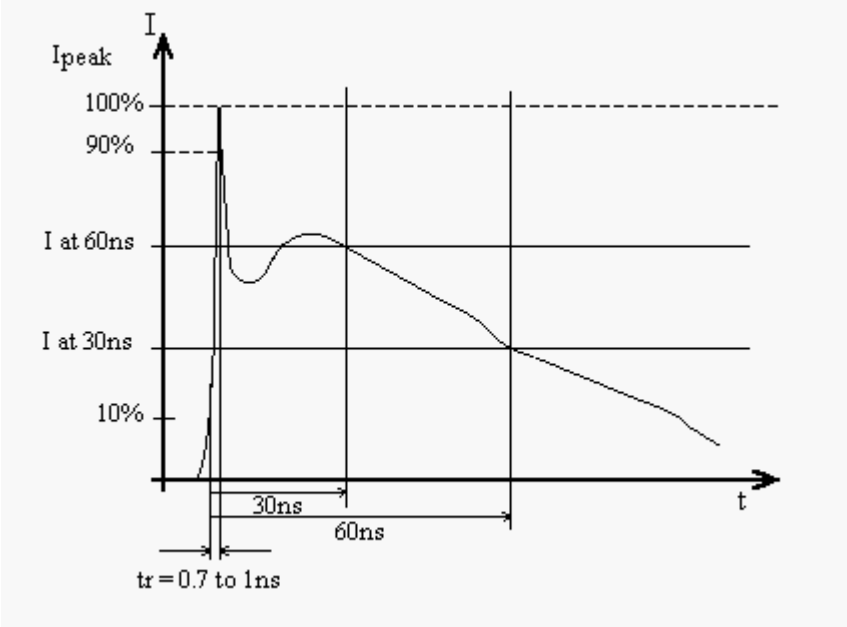
Class C **:** Normal performance within the specification limits

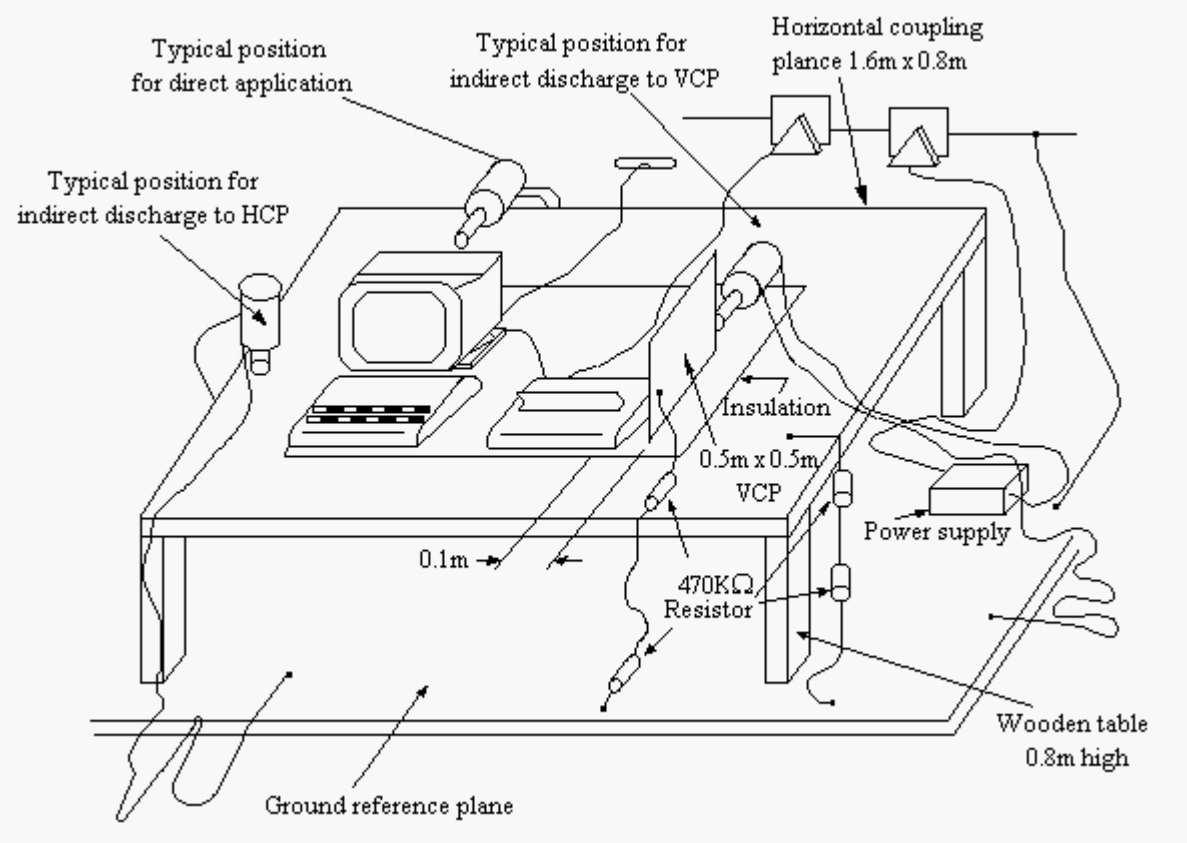
Discharge times: 20 times for each discharge point, time interval 1 second.

In the case of acceptance tests, the test program and the interpretation of the test results are subject to

agreement between manufacturer and user.

The test documentation shall include the test conditions and the test results.





Ambient temperature : 15°C to 35°C
Relative humidity : 30% to 60%

13. QUALITY AND RELIABILITY

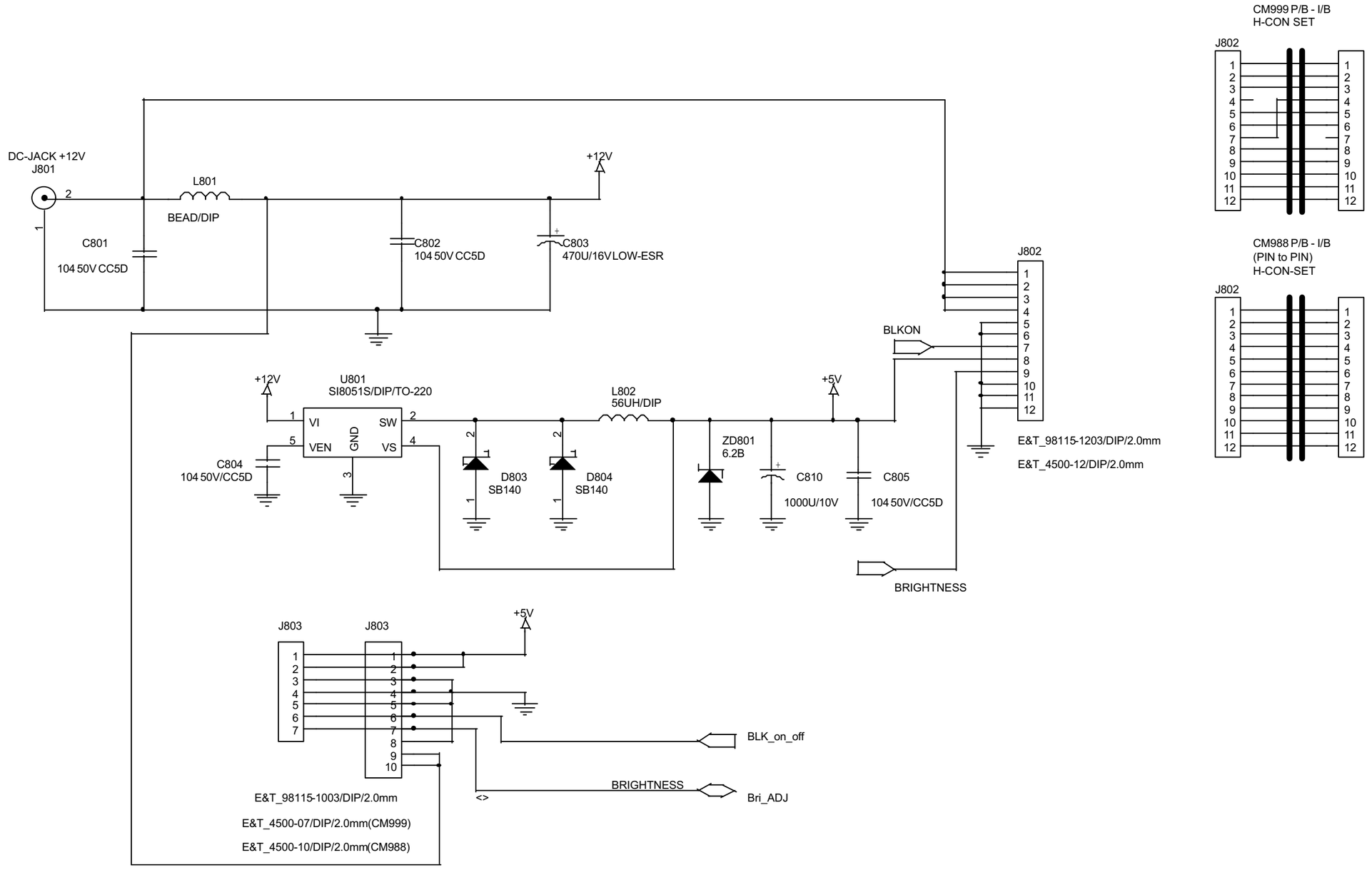
13.1 QUALITY ASSURANCE

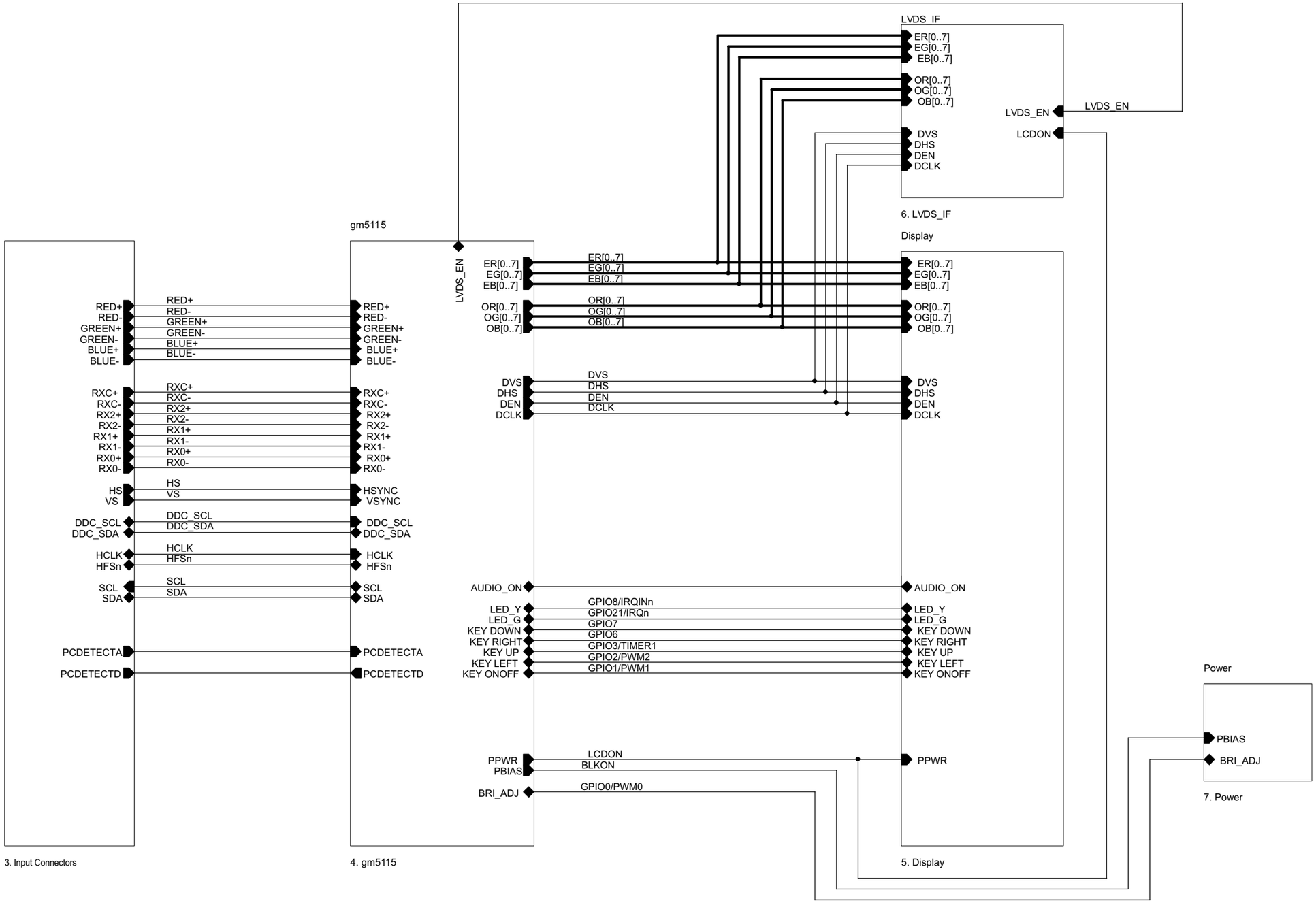
Unless otherwise specified in this specification or the applicable purchase order, the supplier shall be responsible for maintaining a statistical process program or performing inspections that are sufficient to assure that the parts supplied meet the requirements specified herein.

13.2 RELIABILITY

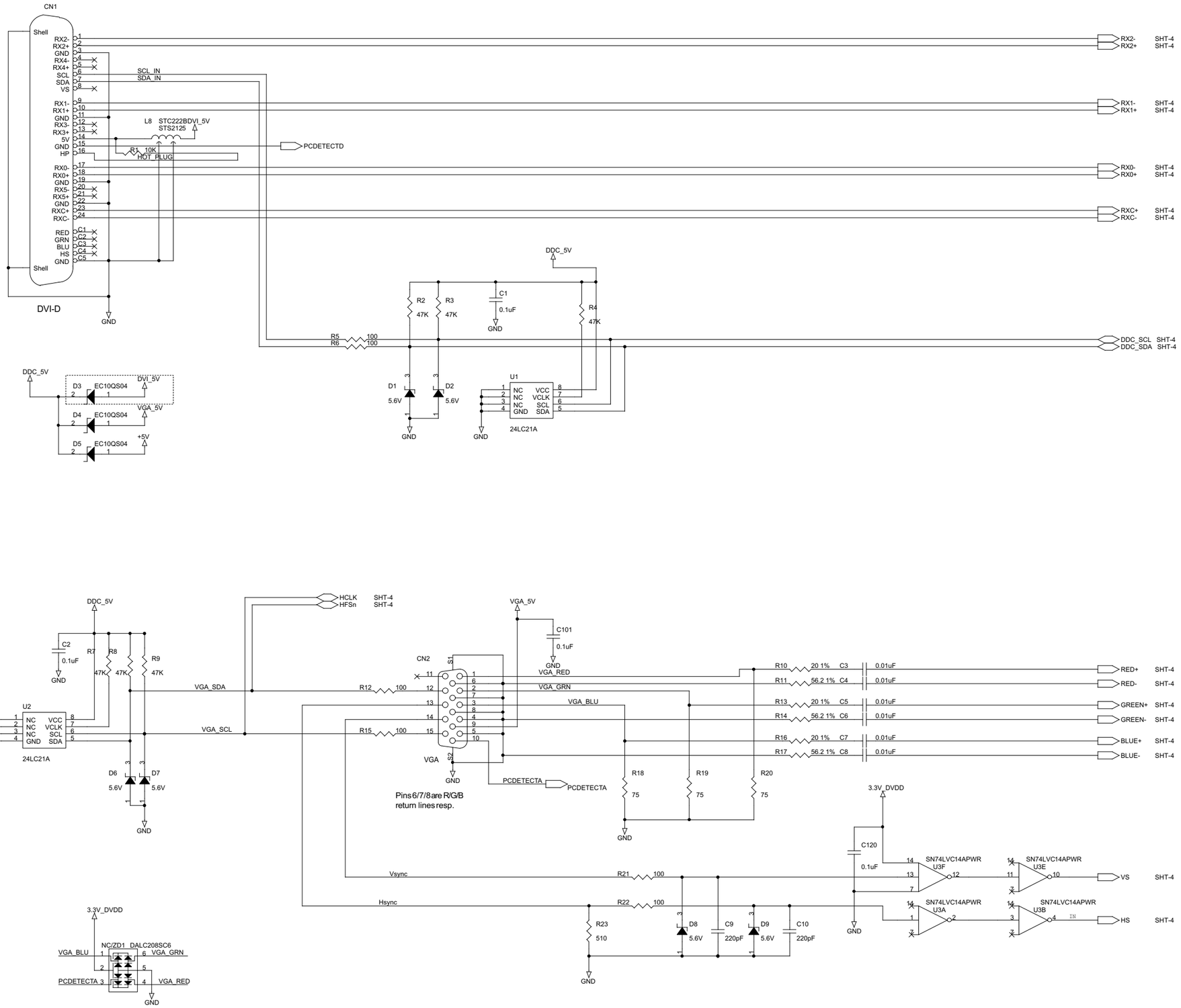
The product shall have a designed MTBF of greater than 20,000 hours during its useful life.

Appendix A: PCBA Assembly


DC-JACK +12V
J801
2
1
L801
BEAD/DIP
C801
104 50V CC5D
C802
104 50V CC5D
C803
470U/16V LOW-ESR
+12V
U801
SI8051S/DIP/TO-220
VI
SW
VEN
GND
VS
C804
104 50V/CC5D
D803
SB140
D804
SB140
L802
56UH/DIP
ZD801
6.2B
C810
1000U/10V
C805
104 50V/CC5D
+5V
BLKON
BRIGHTNESS
J802
E&T_98115-1203/DIP/2.0mm
E&T_4500-12/DIP/2.0mm
J803
J803
+5V
BLK_on_off
BRIGHTNESS
Bri_ADJ
E&T_98115-1003/DIP/2.0mm
E&T_4500-07/DIP/2.0mm(CM999)
E&T_4500-10/DIP/2.0mm(CM988)
CM999 P/B - I/B
H-CON SET
J802
CM988 P/B - I/B
(PIN to PIN)
H-CON-SET
J802



No. 0533	Ctrl/B VL-901 - VGA Input - 1	HITACHI



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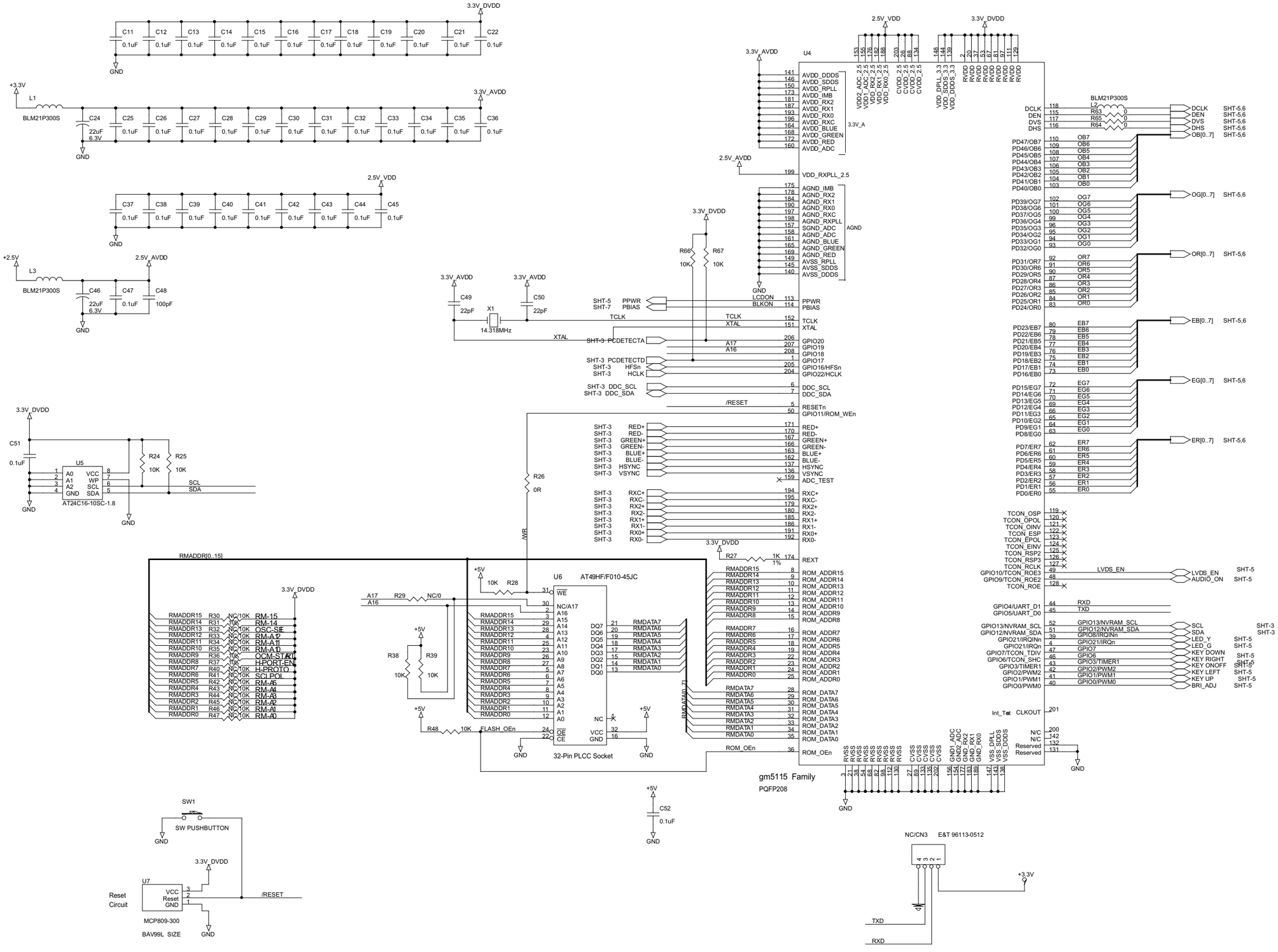
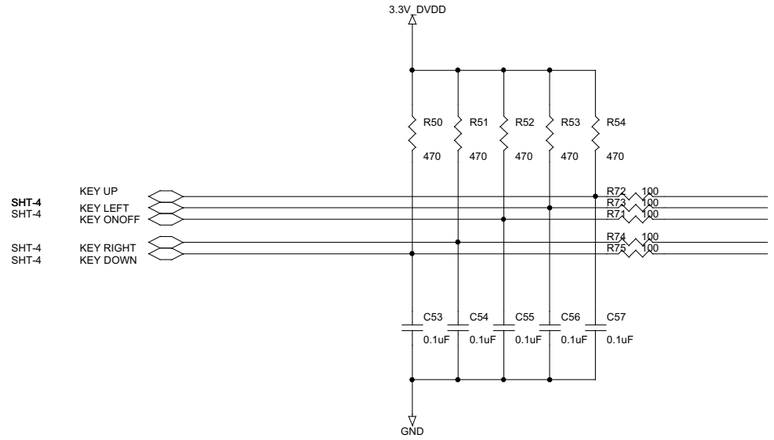
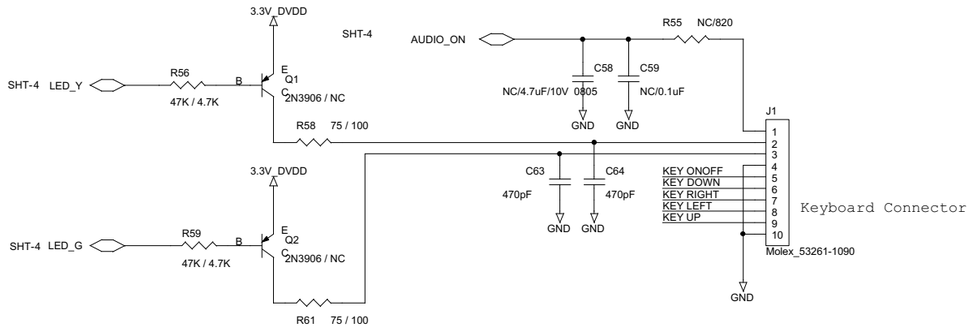
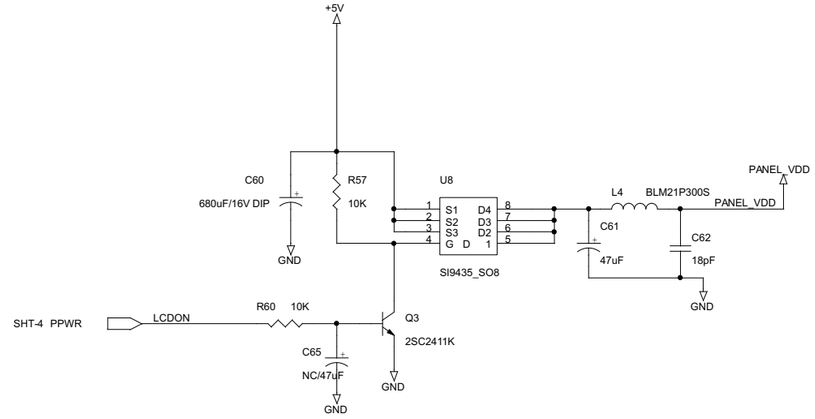

3.3V_DVDD
C11 C12 C13 C14 C15 C16 C17 C18 C19 C20 C21 C22
0.1uF
GND
+3.3V
L1
BLM21P300S
3.3V_AVDD
C24 C25 C26 C27 C28 C29 C30 C31 C32 C33 C34 C35 C36
22uF 6.3V
0.1uF
2.5V_VDD
C37 C38 C39 C40 C41 C42 C43 C44 C45
+2.5V
L3
2.5V_AVDD
C46 C47 C48
100pF
3.3V_DVDD
C51
U5
AT24C16-10SC-1.8
A0 A1 A2 GND VCC WP SCL SDA
R24 R25 10K
SCL
SDA
U4
3.3V_AVDD
AVDD_DDDS AVDD_SDDS AVDD_RPLL AVDD_IMB AVDD_RX2 AVDD_RX1 AVDD_RX0 AVDD_RXC AVDD_BLUE AVDD_GREEN AVDD_RED AVDD_ADC
3.3V_A
2.5V_AVDD
VDD_RXPLL_2.5
AGND_IMB AGND_RX2 AGND_RX1 AGND_RX0 AGND_RXC AGND_RXPLL SGND_ADC AGND_ADC AGND_BLUE AGND_GREEN AGND_RED AVSS_RPLL AVSS_SDDS AVSS_DDDS
AGND
R66 10K
R67 10K
C49 22pF
C50 22pF
X1
14.318MHz
LCDON BLKON
PPWR PBIAS
TCLK XTAL
SHT-3 PCDETECTA
A17 A16
GPIO20 GPIO19 GPIO18 GPIO17 GPIO16/HFSn GPIO22/HCLK
SHT-3 PCDETECTD SHT-3 HFSn SHT-3 HCLK
SHT-3 DDC_SCL SHT-3 DDC_SDA
/RESET
RESETn GPIO11/ROM_WEn
SHT-3 RED+ RED- GREEN+ GREEN- BLUE+ BLUE- HSYNC VSYNC
ADC_TEST
R26 0R
/WR
SHT-3 RXC+ RXC- RX2+ RX2- RX1+ RX1- RX0+ RX0-
3.3V_DVDD
R27 1K 1% REXT
RMADDR[0..15]
U6 AT49HF/F010-45JC
32-Pin PLCC Socket
WE NC/A17 A16 A15 A14 A13 A12 A11 A10 A9 A8 A7 A6 A5 A4 A3 A2 A1 A0 NC OE CE VCC GND
DQ7 DQ6 DQ5 DQ4 DQ3 DQ2 DQ1 DQ0
RMDATA7 RMDATA6 RMDATA5 RMDATA4 RMDATA3 RMDATA2 RMDATA1 RMDATA0
RMDATA[0..7]
R28 10K
R29 NC/0
A17 A16
R38 R39 10K
R48 10K FLASH_OEn
ROM_OEn
RMADDR15 ROM_ADDR14 ROM_ADDR13 ROM_ADDR12 ROM_ADDR11 ROM_ADDR10 ROM_ADDR9 ROM_ADDR8 ROM_ADDR7 ROM_ADDR6 ROM_ADDR5 ROM_ADDR4 ROM_ADDR3 ROM_ADDR2 ROM_ADDR1 ROM_ADDR0
ROM_DATA7 ROM_DATA6 ROM_DATA5 ROM_DATA4 ROM_DATA3 ROM_DATA2 ROM_DATA1 ROM_DATA0
ROM_OEn
gm5115 Family
PQFP208
RVSS CVSS GND1_ADC GND2_ADC GND_RX1 GND_RX0 VSS_DRLL VSS_SDDS VSS_DDDS
2.5V_VDD
VDD2_ADC_2.5 VDD1_ADC_2.5 VDD_RX2_2.5 VDD_RX1_2.5 VDD_RX0_2.5 CVDD_2.5 CVDD_2.5 CVDD_2.5 CVDD_2.5
3.3V_DVDD
VDD_DPLL_3.3 VDD_SDDS_3.3 VDD_DDDS_3.3 RVDD
BLM21P300S
L2
R63 0 R65 0 R64 0
DCLK DEN DVS DHS OB[0..7] OG[0..7] OR[0..7] EB[0..7] EG[0..7] ER[0..7]
SHT-5,6
PD47/OB7 PD46/OB6 PD45/OB5 PD44/OB4 PD43/OB3 PD42/OB2 PD41/OB1 PD40/OB0
PD39/OG7 PD38/OG6 PD37/OG5 PD36/OG4 PD35/OG3 PD34/OG2 PD33/OG1 PD32/OG0
PD31/OR7 PD30/OR6 PD29/OR5 PD28/OR4 PD27/OR3 PD26/OR2 PD25/OR1 PD24/OR0
PD23/EB7 PD22/EB6 PD21/EB5 PD20/EB4 PD19/EB3 PD18/EB2 PD17/EB1 PD16/EB0
PD15/EG7 PD14/EG6 PD13/EG5 PD12/EG4 PD11/EG3 PD10/EG2 PD9/EG1 PD8/EG0
PD7/ER7 PD6/ER6 PD5/ER5 PD4/ER4 PD3/ER3 PD2/ER2 PD1/ER1 PD0/ER0
TCON_OSP TCON_OPOL TCON_OINV TCON_ESP TCON_EPOL TCON_EINV TCON_RSP2 TCON_RSP3 TCON_RCLK
GPIO10/TCON_ROE3 GPIO9/TCON_ROE2 TCON_ROE
LVDS_EN AUDIO_ON
GPIO4/UART_D1 GPIO5/UART_D0
RXD TXD
GPIO13/NVRAM_SCL GPIO12/NVRAM_SDA GPIO21/IRQINn GPIO21/IRQn GPIO7/TCON_TDIV GPIO6/TCON_SHC GPIO3/TIMER1 GPIO2/PWM2 GPIO1/PWM1 GPIO0/PWM0
SCL SDA LED_Y LED_G KEY DOWN KEY RIGHT KEY ONOFF KEY LEFT KEY UP BRI_ADJ
SHT-3 SHT-5
Int_Test CLKOUT
N/C N/C Reserved Reserved
R30 R31 R32 R33 R34 R35 R36 R37 R40 R41 R42 R43 R44 R45 R46 R47 NC/10K
RM-15 RM-14 OSC-SE RM-A12 RM-A11 RM-A10 OCM-START H-PORT-EN H-PROTO SCL POL RM-A6 RM-A4 RM-A3 RM-A2 RM-A1 RM-A0
SW1
SW PUSHBUTTON
U7
MCP809-300
BAV99L SIZE
Reset Circuit
VCC Reset GND
/RESET
C52 0.1uF
NC/CN3 E&T 96113-0512
TXD
RXD
+3.3V
GND







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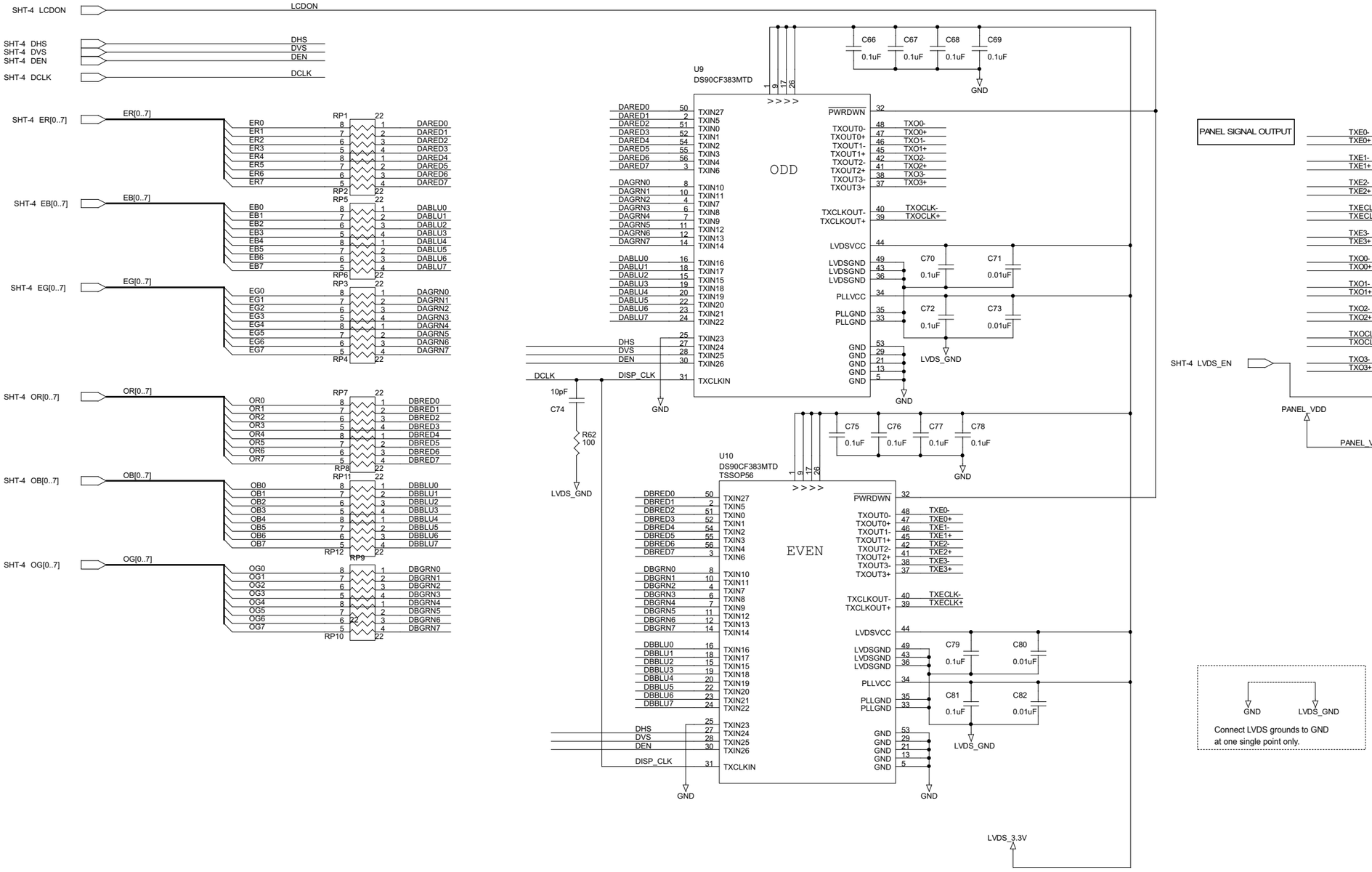

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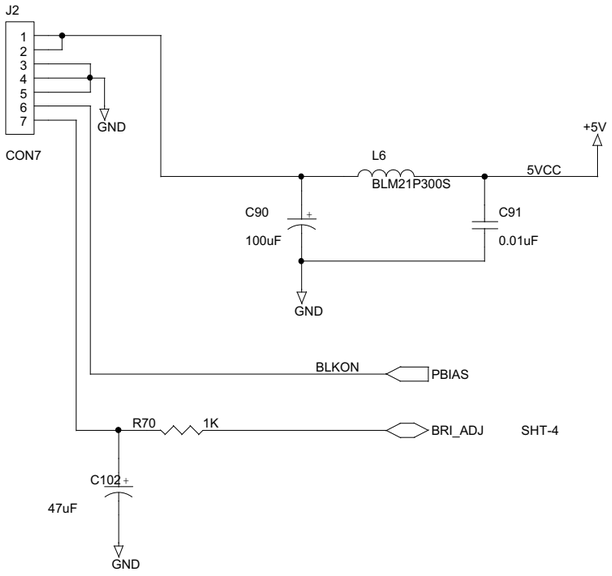
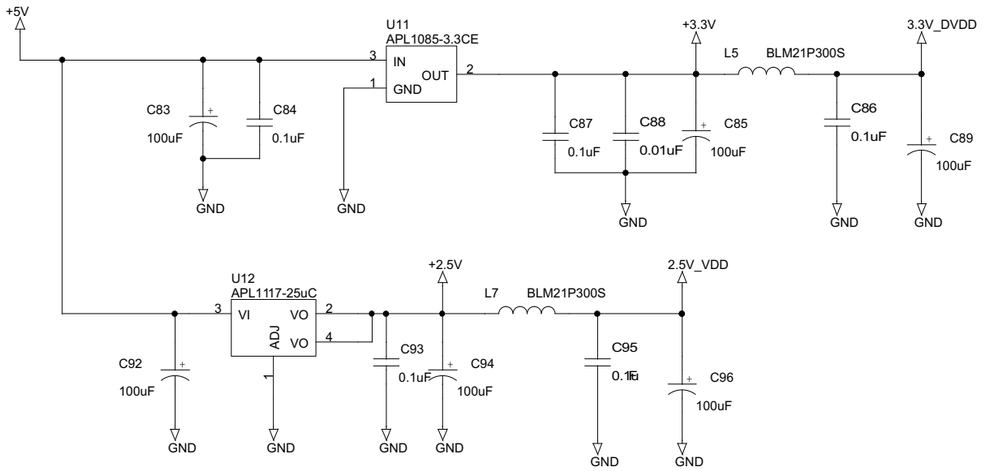
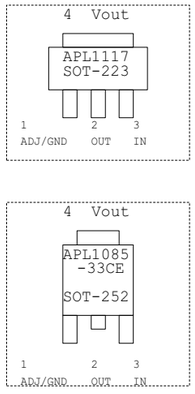
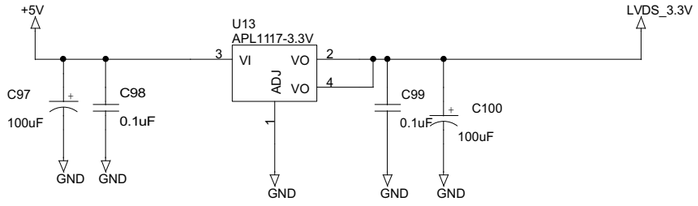

J2
1
2
3
4
5
6
7
CON7
GND
L6
BLM21P300S
+5V
5VCC
C90
100uF
C91
0.01uF
GND
BLKON
PBIAS
R70
1K
BRI_ADJ
SHT-4
C102
47uF
GND

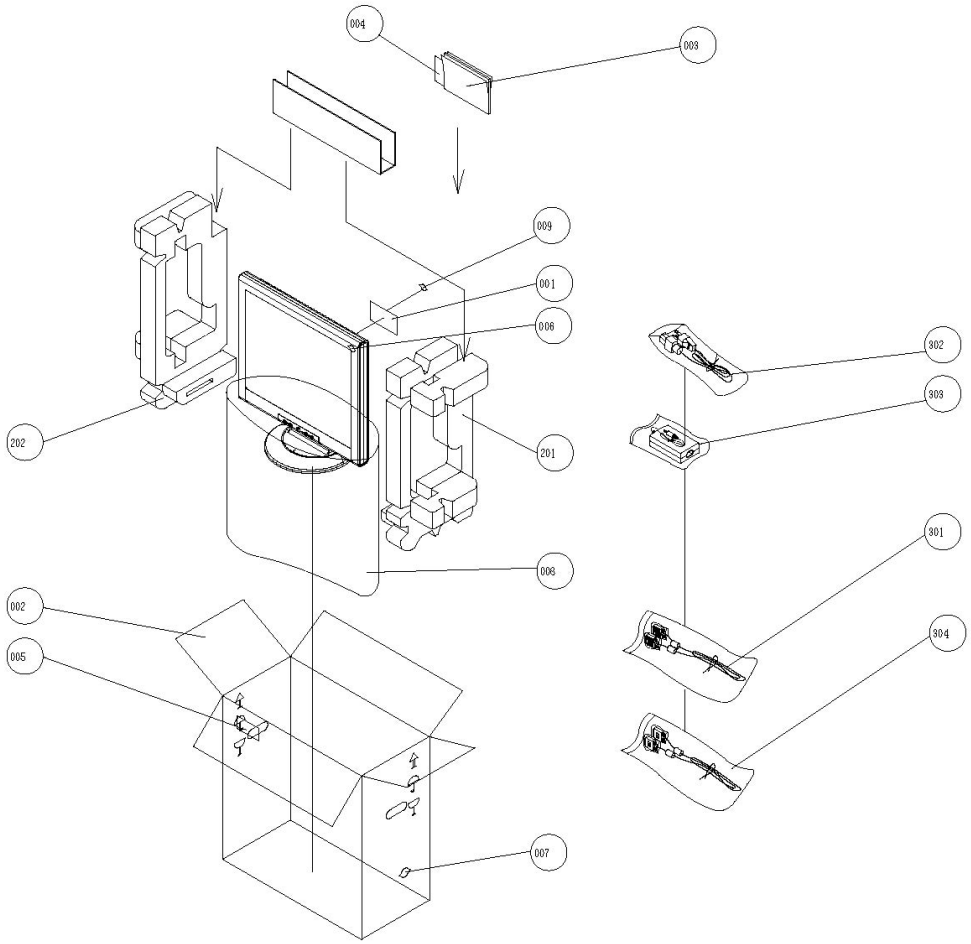

+5V
U11
APL1085-3.3CE
3
IN
OUT
GND
1
2
C83
100uF
C84
0.1uF
GND
GND
+3.3V
L5
BLM21P300S
3.3V_DVDD
C87
0.1uF
C88
0.01uF
C85
100uF
C86
0.1uF
C89
100uF
GND
GND
GND
U12
APL1117-25uC
3
VI
VO
ADJ
VO
2
4
1
+2.5V
L7
BLM21P300S
2.5V_VDD
C92
100uF
C93
0.1uF
C94
100uF
C95
0.1uF
C96
100uF
GND
GND
GND
GND
GND
GND

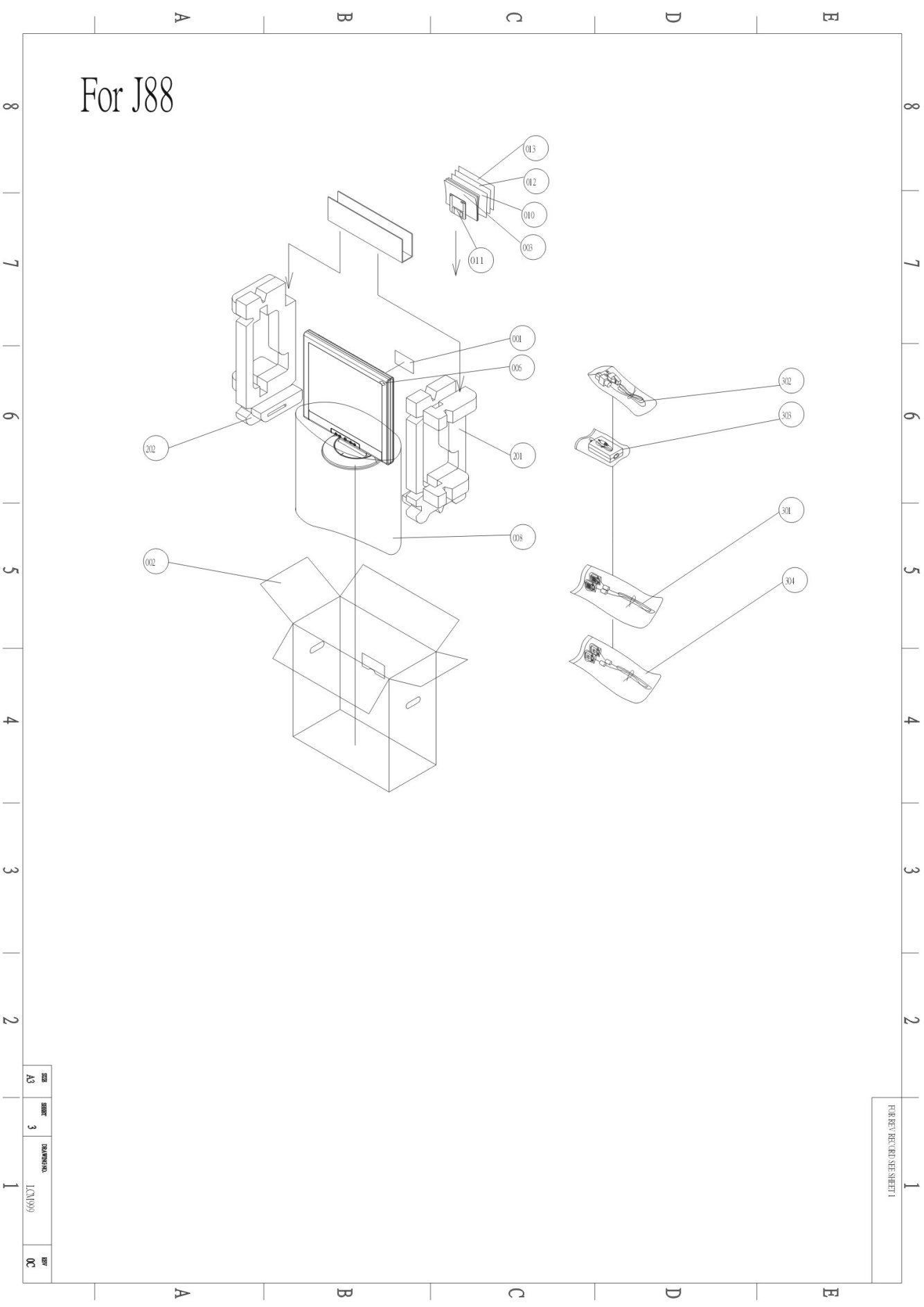

4 Vout
APL1117
SOT-223
1
2
3
ADJ/GND
OUT
IN
4 Vout
APL1085
-33CE
SOT-252
1
2
3
ADJ/GND
OUT
IN

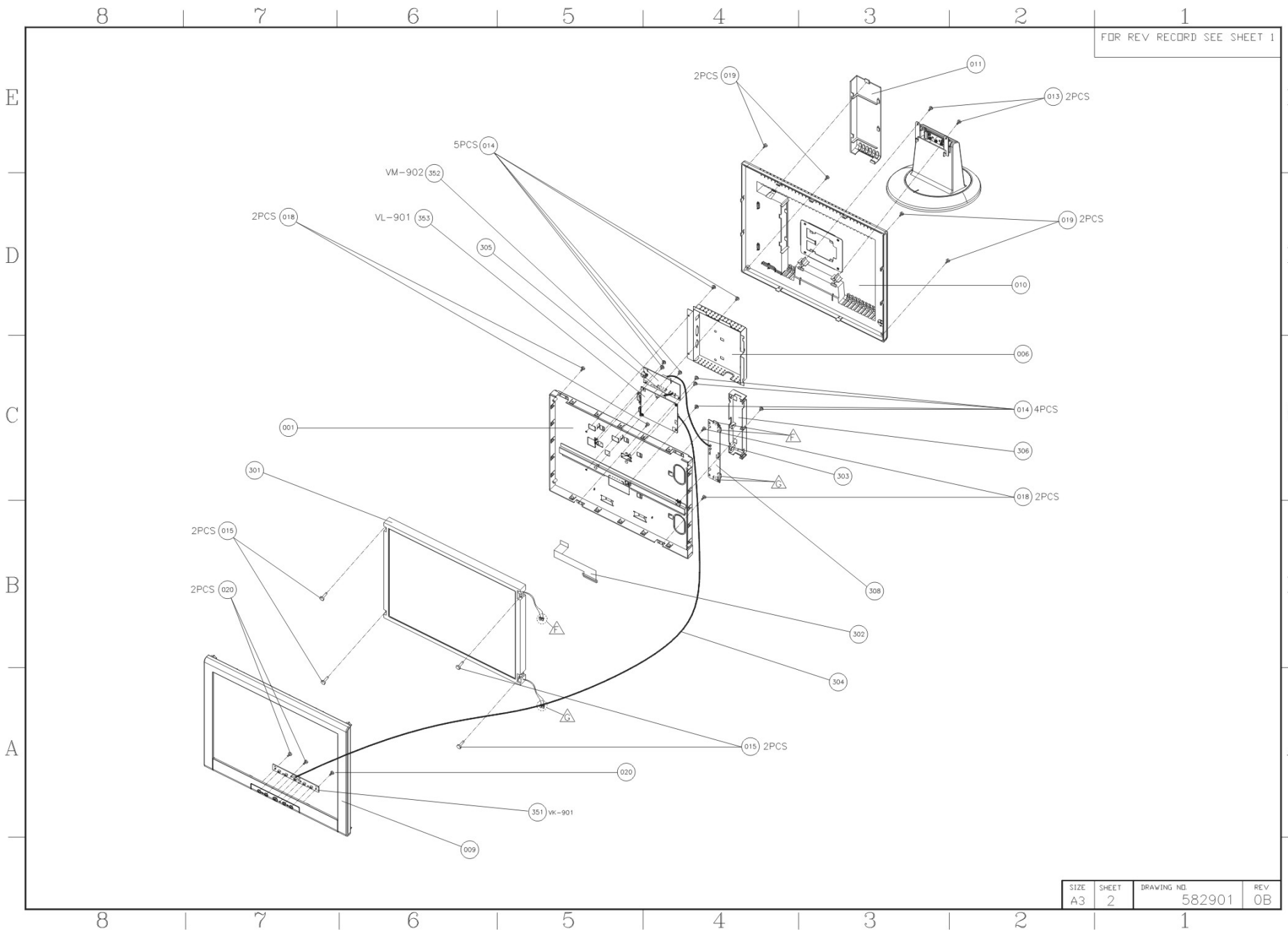

+5V
U13
APL1117-3.3V
3
VI
VO
ADJ
VO
2
4
1
LVDS_3.3V
C97
100uF
C98
0.1uF
C99
0.1uF
C100
100uF
GND
GND
GND
GND
GND

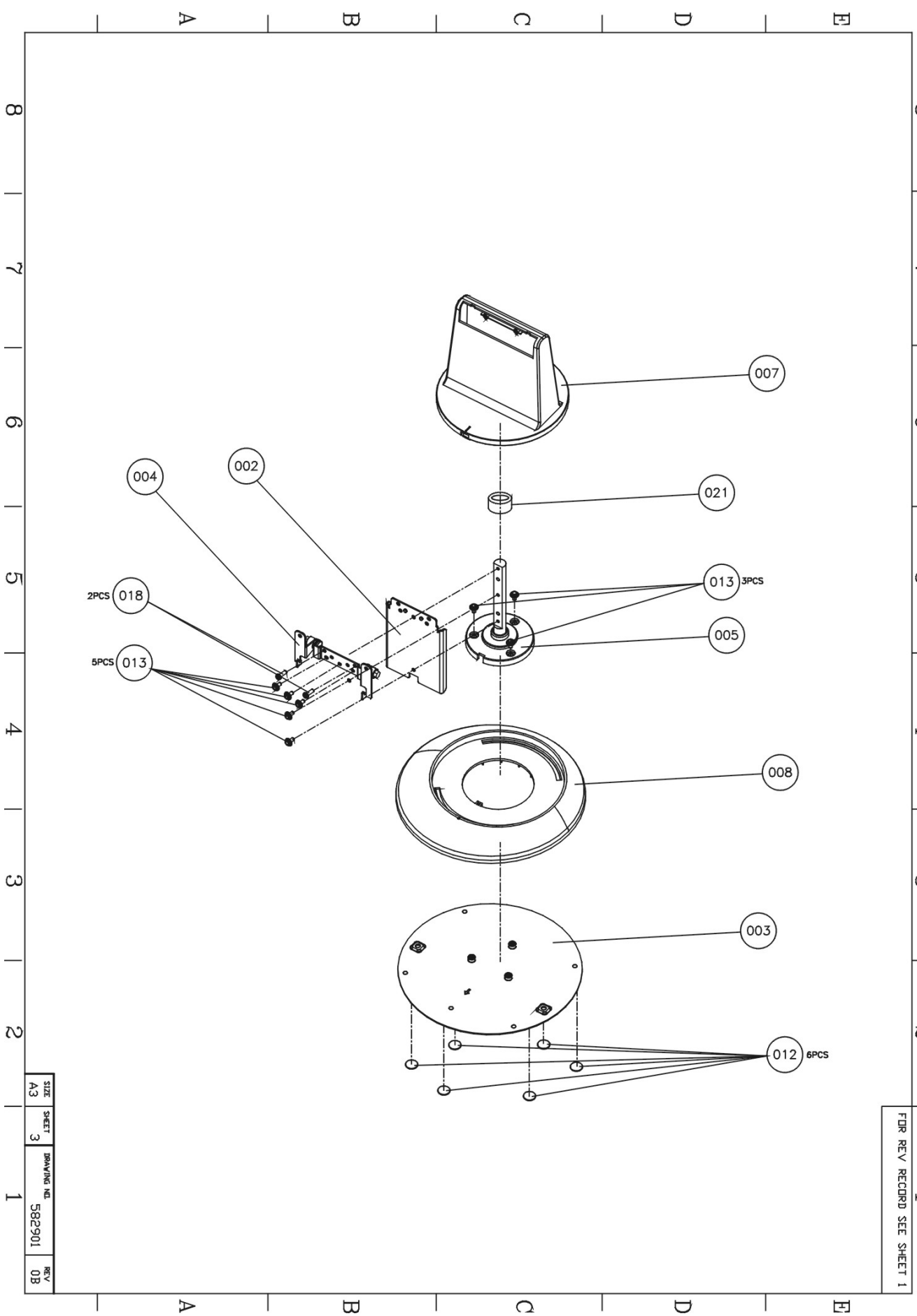
Appendix B: DISPLAY UNIT ASSEMBLY

For Standaard




For J88
013
012
010
003
011
001
005
202
201
008
002
302
303
301
304
SIZE
A3
SHEET
3
DRAWING NO.
LCM1099
REV
OC
FOR REV RECORD SEE SHEET 1


FOR REV RECORD SEE SHEET 1
2PCS 019
011
013 2PCS
5PCS 014
VM-902 352
2PCS 018
VL-901 353
305
019 2PCS
010
006
014 4PCS
001
306
303
018 2PCS
301
308
2PCS 015
2PCS 020
302
304
015 2PCS
020
351 VK-901
009
SIZE A3
SHEET 2
DRAWING NO. 582901
REV 0B


007
021
002
004
013 3PCS
005
2PCS 018
5PCS 013
008
003
012 6PCS
FOR REV RECORD SEE SHEET 1
SIZE A3
SHEET 3
DRAWING NO. 582901
REV 0B

THE UPDATED PARTS LIST

FOR THIS MODEL IS

AVAILABLE ON ESTA

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